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*Screening-Level Ecological Assessment
(SLERA)*

**Martin Aaron Superfund Site
Camden, New Jersey**

Prepared for



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Contents

1	Introduction.....	1-1
2	Screening-Level Problem Formulation	2-1
2.1	Environmental Setting	2-1
2.1.1	Site Location and Surrounding Land Use.....	2-1
2.1.2	Site Habitats and Biota.....	2-2
2.1.3	Rare, Threatened, and Endangered Species	2-3
2.1.4	Historic Site Activities and Potential Site-Related Contaminants	2-3
2.2	Conceptual Model	2-4
2.2.1	Contaminant Fate and Transport Mechanisms, Potentially Complete Exposure Pathways, and Mechanisms of Toxicity	2-4
2.2.2	Receptors and Endpoints for Evaluation	2-6
3	Screening-Level Effects Evaluation	3-1
3.1	Medium-Specific Screening Values.....	3-1
3.2	Ingestion Screening Values	3-1
4	Screening-Level Exposure Estimate.....	4-1
4.1	Selection Criteria for Analytical Data	4-1
4.2	Data Groupings.....	4-2
4.3	Exposure Point Concentrations	4-2
4.3.1	Direct Exposure	4-2
4.3.2	Food-Web Exposure.....	4-2
4.4	Dietary Intakes.....	4-4
5	Screening-Level Risk Calculations	5-1
5.1	Direct Exposure.....	5-1
5.1.1	Surface Soil	5-1
5.1.2	Groundwater.....	5-3
5.2	Food-Web Exposure.....	5-5
5.2.1	Martin Aaron Property	5-5
5.2.2	South Jersey Port Corporation Property	5-6
6	Uncertainties	6-1
7	Conclusions	7-1
8	References.....	8-1

Tables

- 1 Rare Species Within the Vicinity of the Martin Aaron Site
- 2 Preliminary Assessment Endpoints, Measurement Endpoints, and Receptor Organisms
- 3 Medium-Specific Screening Value Sources

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- 4 Ecological Risk Screening Criteria for Soil
 - 5 Ecological Risk Screening Criteria for Water
 - 6 Ingestion Screening Values for Mammals
 - 7 Ingestion Screening Values for Birds
 - 8 Sample Groupings
 - 9 Summary Statistics for Surface Soil—Martin Aaron Property
 - 10 Summary Statistics for Surface Soil—South Jersey Port Corporation Property
 - 11 Summary Statistics for Groundwater—Shallow Monitoring Wells from Round 1 (June 2002)
 - 12 Summary Statistics for Groundwater—Shallow Monitoring Wells from Round 2 (September 2002)
 - 13 Soil Bioconcentration Factors for Plants and Soil Invertebrates
 - 14 Exposure Parameters for Upper-Trophic-Level Ecological Receptors
 - 15 Step 2 Screening Statistics for Surface Soil—Martin Aaron Property
 - 16 Step 2 Screening Statistics for Surface Soil—South Jersey Port Corporation Property
 - 17 Step 2 Screening Statistics for Groundwater—Shallow Monitoring Wells from Round 1 (June 2002)
 - 18 Step 2 Summary Statistics for Groundwater—Shallow Monitoring Wells from Round 2 (September 2002)
 - 19 Hazard Quotients (HQs) for Food-Web Exposure—Martin Aaron Property
 - 20 Hazard Quotients (HQs) for Food-Web Exposure—South Jersey Port Corporation Property

Figures

- 1 Preliminary Conceptual Model

Attachments

- A Checklist for Ecological Assessment/Sampling
- B Threatened and Endangered Species Search Results
- C Calculations of BCFs for Organic Chemicals
- D Example Spreadsheets for Foodweb Model Calculations

1 Introduction

This Appendix contains a Screening-Level Ecological Risk Assessment (SLERA) for the Martin Aaron Superfund Site, Camden, New Jersey. The SLERA constitutes Step 1 (screening level problem formulation and effects evaluation) and Step 2 (exposure estimate and risk calculation) of the eight-step ERA process presented in *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (USEPA, 1997).

The objectives of this SLERA are to:

- Determine if: (1) assessment is necessary beyond the conservative screening steps of the ERA process (ecological risks possible), or (2) this site can be excluded from further ecological consideration (no potential for ecological risks).
- Identify potential data gaps or unacceptable levels of uncertainty requiring the collection of additional data to support ERA evaluations beyond the screening level.

At the conclusion of the SLERA, there are four possible decision points:

- **No further action is warranted.** This decision is appropriate if the SLERA indicates that sufficient data are available for a conclusion of no unacceptable risk with an acceptable level of uncertainty.
- **Further evaluation is warranted.** This decision is appropriate if the SLERA indicates the potential for unacceptable risks for some pathways, receptors, and chemicals. In this instance, the ERA would progress to Step 3 of the 8-step process.
- **Further data are required.** This decision is appropriate if the SLERA indicates that there are insufficient data on which to base a risk estimate.
- **Remedial action required.** This decision may be appropriate for circumstances in which the potential for unacceptable risks was identified following the SLERA and these potential risks could best be addressed through remedial action (e.g., presumptive remedy, soil removal) rather than additional study.

2 Screening-Level Problem Formulation

The problem formulation establishes the SLERA's goals, scope, and focus. As part of problem formulation, a site's environmental setting is characterized in terms of the habitats and biota known or likely to be present, and the types and concentrations of chemicals that are present in ecologically relevant media. A conceptual model is developed for the site that describes potential sources, potential transport pathways, potential exposure pathways and routes, and potential receptors. Assessment and measurement endpoints are then selected to evaluate those receptors for which complete and potentially significant exposure pathways are likely to exist for the exposure scenarios evaluated. The fate, transport, and toxicological properties of the chemicals present at a site are also considered during this process.

2.1 Environmental Setting

2.1.1 Site Location and Surrounding Land Use

The Martin Aaron Superfund Site ("Site") consists of the Martin Aaron Property, the South Jersey Property, a salvage yard, food-processing property (Comarco), and an abandoned property (Ponte). The Martin Aaron Property is at 1542 South Broadway Street in Camden, New Jersey. It covers approximately 2.4 acres and was used as a drum recycling facility from 1969 until 1998. An additional property of concern is located west of the Martin Aaron Property at 1535 South Broadway Street, and is owned by the South Jersey Port Corporation. It is approximately 3.6 acres in size and was included in the Remedial Investigation (RI) and SLERA because it received and sorted drums for Martin Aaron during its previous operations. Both the Site and the South Jersey Port property are surrounded by 8-ft-high chain-link fences. The locations of the Martin Aaron and South Jersey Property are shown in Figures 3-1 and 3-2 of the RI.

Martin Aaron, Incorporated (Martin Aaron) purchased the Site in 1969. Martin Aaron operated a drum recycling business from 1969 to 1985 under the name "Drum Services of Camden." In 1985, Martin Aaron sold the business to a corporation jointly run by Westfall Ace Drum Company (Wadco) and Rhodes Drum Company (Rhodes). Wadco occupied most property and continued operations until March 1995. Rhodes operated near the Site's southwestern corner until the spring of 1998.

The Martin Aaron Property has a long history of industrial use prior to being used as a drum recycling facility. Between 1887 and 1908, the Kifferty Morocco Manufacturing Company operated a leather tanning and glazing business on the property. The Castle Kid Company purchased the land in 1908 and manufactured glazed leathers until 1940, when the City of Camden seized the property for tax delinquency. Benjamin Schmerling purchased the property in 1940 and leased portions of it to the H. Preston Lowden Company for wool and hair blending and to the American Chain and Cable Company—Pennsylvania Lawnmower Division for manufacturing.

The area around the Site is a mixture of industrial and residential development. The Delaware River is approximately 0.4 miles west, the Cooper River is about 1.2 miles

northeast, and the North Branch of Newton Creek is about 1 mile south. The Cooper River and the North Branch of Newton Creek are both tributaries to the Delaware River. Numerous wetlands are associated with these water bodies and are present in low-lying areas surrounding the Site.

2.1.2 Site Habitats and Biota

A qualitative evaluation of the Site (site walk) was conducted by a CH2M HILL ecologist during July of 2001. Observations made during the site walk were documented in the *Checklist for Ecological Assessment/Sampling*, which was taken from Appendix B of *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (USEPA, 1997). Checklists for the Martin Aaron Property and the South Jersey Property are presented in Attachment A, and a more detailed site description is presented in this section.

Habitats on the Martin Aaron property have been greatly altered by past site activities. Approximately 10 percent of the 2.4-acre Site is covered by a single building in the property's southeastern portion. An additional 8 to 10 percent is covered by paved or concrete surfaces. These areas do not provide potential habitat for most ecological receptors. Most of the rest consists of a relatively flat open-soil area. The soil has been compacted and contains a high gravel/rubble content as a result of past activities. Opportunistic grass species have become established in this open soil area. The property contains a few deciduous hardwood trees immediately adjacent to the eastern/northeastern boundary. Approximately 25 percent of the South Jersey Port Corporation property is covered by buildings and another 20 percent is covered with paved or concrete surfaces. The rest of this property contains periodically mowed mixed grasses. Both land parcels are surrounded by an 8-ft-high chain-link fence.

There are no viable aquatic habitats onsite. A small emergent wetland (about 4 x 8 ft) is present in a depressed soil area reportedly created during an interim remedial action. This small wetland area is currently overgrown by cattail (*Typha latifolia*). It is expected that the area will only contain water for limited periods following storm events, and therefore will not support a viable aquatic community.

Based on the industrialized nature of the Site and surrounding area, the properties are expected to provide habitat for a very limited number of urban-adapted species. Birds found on the Site will likely be limited primarily to exotic species such as European starling (*Sturnus vulgaris*), rock dove (*Columba livia*), house finch (*Carpodacus mexicanus*), and house sparrow (*Passer domesticus*). Such birds as the American robin (*Turdus migratorius*) have been observed onsite and might forage on the properties. The Site may also support a very limited number of urban-adapted small mammals such as the black rat (*Rattus rattus*), brown rat (*Rattus norvegicus*), house mouse (*Mus musculus*), and possibly white-footed mouse (*Peromyscus leucopus*). The limited presence of water, the high gravel/rubble content of onsite soils, and the highly developed surrounding habitat limits the ability for diverse small mammals to inhabit the Site. Predatory bird species, such as red-tailed hawks (*Buteo jamaicensis*), may periodically prey on small mammals or birds residing on the property.

Based on the limited amount of surface water, amphibians are unlikely to be present. However, a limited number of reptiles (such as snakes) may be found.

2.1.3 Rare, Threatened, and Endangered Species

Literature-based searches on rare, threatened, and endangered species and critical habitat were conducted through both the U.S. Fish and Wildlife Service, New Jersey Field Office and the New Jersey Department of Environmental Protection (NJDEP), Office of Natural Lands Management. Separate searches were conducted for: 1) the area bounded by the Site, and 2) the area within its 5-mile radius. Results of the U.S. Fish and Wildlife search indicate that, except for the occasional transient bald eagle (*Haliaeetus leucocephalus*), no federally listed or proposed endangered or threatened flora or fauna are known to occur on or within a 5-mile radius.

The NJDEP search indicated the presence of several vertebrate, invertebrate, and plant species within a five mile radius of the Martin Aaron Site. Table 1 summarizes common names of these species. However, habitats on the Martin Aaron Site and the South Jersey Port Corporation property are unlikely to support the species. Based on their relatively large habitat/foraging range, peregrine falcon are unlikely to spend significant time foraging on these sites. The other vertebrate species (bog turtle) and the benthic invertebrates listed in Table 1 occur mostly in wetland and aquatic habitats. Although they may occur within the nearby river/estuary system, they would not occur within onsite habitats. Similarly, the majority of plant species identified in Table 1 would occur in wetland habitats, which are largely absent on the Martin Aaron Site. The rare, threatened, and endangered species literature-based search results were consistent with these observations and did not indicate the presence of rare plants or natural communities on the sites. The results of these searches are presented in Attachment B.

2.1.4 Historic Site Activities and Potential Site-Related Contaminants

As summarized in the *Revised Work Plan, Martin Aaron Remedial Investigation/Feasibility Study, Volume I and II* (CH2M HILL, 2001), numerous areas of concern have been identified at the Site. These include the following:

- Former Processing Buildings. Drums were drained, pressure-washed with caustic solutions, and rinsed in these buildings. Residues from these activities were collected in four sewer basins and reportedly discharged to the combined sanitary/stormwater sewage system following pH adjustment. Contaminants, paint residues, and wastewater may have been released to onsite soils through cracks in the building floors and floor drains. It is also suspected that some effluent in the sewer basins infiltrated directly into subsurface soils and to groundwater. Drums were also sandblasted and painted following the cleaning activities, which also may have led to the deposition of paint residues and sandblast grits to soils.
- Drum/Container Storage Areas and Onsite Storage Tanks. The outdoor areas were used for storing drums, aboveground tanks, and roll-off containers. Site inspections conducted by the NJDEP in 1981 identified the presence of leaking roll-off containers used for hazardous waste storage. A 1983 U.S. Environmental Protection Agency (USEPA) inspection identified leaks in drums stored at the Site. Underground storage tanks were also reported to have been present onsite.

- Waste Burial/Direct Disposal. Available information indicates that holes were dug throughout the property for liquid and solid waste disposal and that 200 to 1,000 waste containers were buried onsite.

Sampling conducted during the NJDEP RI (Kimball and Associates, 2000) indicated the presence of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), and inorganic chemicals in the Site sewer basins and drums. Surface and subsurface soil at the Site indicate the presence of organic chemicals including chlorinated and aromatic VOCs and SVOCs. Inorganic chemicals found at high concentrations in these source areas included arsenic, barium, beryllium, cadmium, chromium, and lead. Such chemicals as chlorinated and aromatic VOCs, pesticides/PCBs, and elevated concentrations of metals, were detected in shallow groundwater at the Site extending beyond the Martin Aaron property boundaries. Deeper aquifer zones were determined to have lesser chemical concentrations.

2.2 Conceptual Model

The preceding sections described the environmental setting, past activities, and potential chemical sources associated with the Site. The following sections discuss the potential fate of these contaminants and possible exposure pathways and toxicity mechanisms for ecological receptors and identifies receptors, exposure pathways, and assessment endpoints for evaluation in the SLERA.

2.2.1 Contaminant Fate and Transport Mechanisms, Potentially Complete Exposure Pathways, and Mechanisms of Toxicity

Figure 1 presents a preliminary conceptual model that summarizes the most-important pathways by which chemicals are likely transported in the environment following release at the Site. This section briefly reviews these pathways and identifies the specific routes by which potential ecological receptors could be exposed to chemicals following release/transport to the environment. Incidental ingestion of soil at the Site is implied, but not shown, in Figure 1. Exposures via drinking water are not expected, as there is no permanent onsite fresh-water source.

Chemicals from past site activities are likely to have entered surface soil via direct release (Figure 1). The primary sources of chemicals in surface soil are likely to be associated with past direct disposal to this medium, leakage from drums and storage tanks at the Site, and the aerial deposition of materials resulting from sandblasting/painting activities. Once deposited to surface soil, chemicals could reach subsurface soil via infiltration. Infiltration and the direct disposal of wastes to pits, drum burial, and leakage from the sewer basins are likely to represent the most-important release mechanisms to subsurface soil. Potential ecological receptors at the Site could be exposed to chemicals present in surface soil. Subsurface soil is less accessible to most wildlife and was not selected as an exposure medium for evaluation in the SLERA.

As discussed in the preceding sections, there are no viable aquatic habitats on the Site. However, chemicals in surface and subsurface soil could infiltrate into groundwater. Although groundwater is considered inaccessible to wildlife, chemicals could enter the shallow aquifer and be transported to offsite locations, where they could potentially

discharge to surface water and sediment and become accessible to wildlife, including some of the rare species identified in Table 1. However, it cannot be definitively determined if rare species occur within any of the nearby aquatic habitats and/or if this potential exposure pathway is complete..

Data collected during the RI suggest that groundwater in the shallow aquifer travels east/southeast as it moves away from the Site. It is possible that groundwater from the Site discharges to the Cooper River, North Branch of Newton Creek, and/or other wetland areas east/southeast of the Site (see Figure 4-11). Figure 4-11 depicts the regional groundwater flow direction. Although it is unknown whether this is a complete pathway and whether rare species might be exposed, chemicals detected in the shallow aquifer were screened to determine if they are present at concentrations that could adversely affect aquatic life if groundwater discharges to the sediment and surface water of nearby water bodies. This analysis is conservative and likely overestimates actual exposure concentrations because substantial mixing and dilution would likely occur prior to, and immediately following, discharge to a surface water body.

The Site is relatively flat and it is expected that most water would puddle onsite during most storm events and either infiltrate surface and subsurface soils or evaporate. However, during large storms, chemicals could potentially run off and enter stormwater drains located along both Sixth and Broadway Streets, where they would enter a combined sanitary/stormwater sewer system. During most storms, discharge to this sewer system would be transported to a wastewater treatment plant for processing. Under extremely high-flow conditions, it is possible that chemicals entering this system could bypass the wastewater treatment plant and discharge directly to nearby surface-water bodies. However, once entering the combined sanitary/stormwater sewer system, Site runoff would combine with potentially contaminated runoff from numerous other sources in this industrialized area, and the potential risk associated with the Site could not be differentiated from that associated with these other sources. Chemical analytical data from surface soil collected at the Site were used to qualitatively evaluate the potential importance of this chemical transport pathway. However, because of the presence of multiple chemical sources to the combined sanitary/stormwater sewer system, this potential transport/exposure pathway was not quantitatively evaluated in the SLERA.

The Site is expected to support a very limited number of opportunistic/urban-adapted wildlife species able to inhabit highly disturbed environments. As shown on Figure 1, these organisms may be exposed to chemicals via several routes once they have entered the environment.

Figure 1 depicts the specific pathways/routes of potential exposure for the different functional groups or "guilds" of wildlife on this property and identifies the receptor groups selected for evaluation. There are two primary routes by which receptors could be exposed to chemicals: direct exposure and indirect exposure (following chemical bioaccumulation in the food web). The relative importance of these pathways depends on both the ecological receptor and the chemical being considered. Many lower-trophic-level species (plants and most invertebrates) would have their greatest or only exposure through direct contact with contaminated media. Terrestrial wildlife may be exposed to chemicals via a broader range of exposure routes, including: 1) ingestion of contaminated soil and food; 2) dermal absorption of chemicals from soil via direct contact; and 3) inhalation of chemicals that have volatized

from or been wind-eroded and entrained from soil. As noted above, the relative importance of these exposure routes depends in part on the chemicals being evaluated. If chemicals are present that can bioaccumulate (e.g., PCBs), the greatest exposure to wildlife might be from the ingestion of prey. If chemicals having only a limited potential to bioaccumulate are present, the wildlife exposure to chemicals is likely to be greatest through the direct ingestion of soil. Wildlife could also be exposed to chemicals via dermal absorption and inhalation. However, fur or feathers would limit dermal exposure to most chemicals. Potential inhalation exposure is also expected to be limited because the site soils are compacted, have some vegetation, and little wind erosion is likely to occur. Because these pathways are expected to be insignificant in comparison to other potential exposure pathways, such as the ingestion of food or soil, they were not selected for further evaluation in the SLERA.

2.2.2 Receptors and Endpoints for Evaluation

The conclusion of the problem-formulation stage includes the selection of assessment and measurement endpoints, based on the preliminary conceptual model. Endpoints in the SLERA define ecological attributes to be protected (assessment endpoints) and their measurable characteristics (measurement endpoints) that can be used to gauge the degree of impact that either has occurred or could occur. Assessment endpoints most often relate to attributes of biological populations or communities, and are intended to focus the risk assessment on particular ecosystem components that could be adversely affected by contaminants from the Site (USEPA, 1997). Assessment endpoints contain an entity, which is often represented by a guild in the Site's ecosystem (e.g., mammalian herbivores/granivores), and that entity's ecologically relevant attributes (e.g., survival rate and/or reproduction).

Even in highly disturbed ecosystems, it is generally not possible to directly assess potential impacts to all ecological receptors within an area. Therefore, receptor species (e.g., American robin) or species groups (e.g., soil invertebrates) are often selected as surrogates to represent the larger components of the ecological community (e.g., guilds such as avian omnivores) identified in the assessment endpoints. Species selected as surrogates typically have the following characteristics:

- Are known to occur, or are likely to occur, at the Site
- Have a particular ecological, economic, or aesthetic value
- Are representative of taxonomic groups, life-history traits and/or trophic levels in the habitats present at the Site for which complete exposure pathways are likely to exist
- Can be expected to represent potentially sensitive populations at the Site because of toxicological sensitivity or potential exposure magnitude
- There is sufficient ecotoxicological information available on which to base an evaluation

Based on the habitat and chemicals potentially present on the Site, only four assessment endpoints were chosen for evaluation in the SLERA. Lower-trophic-level receptor species (e.g., plants and soil invertebrates) were evaluated in the SLERA based on general taxonomic groupings because of limitations in the availability of species-specific information for individual organisms within these groups. As such, specific species were not chosen as

receptors and these groups were dealt with on a community level. Terrestrial assessment endpoints and corresponding surrogates are described below, along with a brief rationale for their selection.

Survival, growth, and reproduction of terrestrial plant and soil invertebrate communities. Plant communities provide cover/nesting habitat and form the base of the terrestrial food web. As mentioned above, the Site supports a limited diversity of opportunistic grass species capable of growing in the property's compacted and high-gravel-content soils. However, given the highly industrialized/urbanized areas surrounding the Site, these grasses may provide habitat/forage material for some urbanized species.

Soil invertebrates were identified for evaluation because they might serve as a forage base for some avian and mammalian species in this highly industrialized/urbanized area. Soil invertebrates can also promote soil fertility by breaking down organic matter and releasing nutrients and improve soil aeration, drainage, and aggregation. It should be recognized, however, that the abundance and diversity of the Site's soil invertebrate communities are likely to be limited by the presence of gravel/rubble and past compaction of onsite soils.

Based on the general nature of plant-toxicity data, no specific plant species was selected for evaluation. Terrestrial plants in general were instead identified as surrogate organisms for evaluation. Earthworms were selected as surrogate organisms for evaluating the potential adverse effects to soil invertebrates as they have direct contact with soil and are sensitive to chemicals in soil, relative to other soil invertebrates. Furthermore, toxicity data for earthworms is readily available in the scientific literature. Terrestrial plant and soil invertebrate (earthworm) toxicity values were compared and the lower of the two values was selected to screen potentially adverse effects for this combined assessment endpoint.

Survival, growth, and reproduction of avian omnivores. These receptors represent second-order consumers that could be exposed to chemicals accumulated (from soil) by soil invertebrates and plants. Due to their foraging characteristics, these receptors are also exposed to chemicals by the direct ingestion of soil.

The American robin (*Turdus migratorius*) was chosen to represent this assessment endpoint and was selected as the surrogate organism because soil invertebrates and plant materials comprise a large proportion of its diet. Furthermore, robins have been observed at the Site.

Survival, growth, and reproduction of mammalian omnivores. These receptors represent second-order consumers that could be exposed to chemicals accumulated (from soil) by soil invertebrates and plants. The white-footed mouse (*Peromyscus leucopus*) was chosen as the surrogate species for this assessment endpoint because it is possible this species may be present onsite. However, as discussed above, the habitat associated with the Site is expected to support only a limited mammalian population, because of the highly urbanized habitats on the property and in surrounding areas and the limited onsite water supply.

Survival, growth, and reproduction of aquatic communities and amphibians. No viable aquatic habitats are present on the Site that could support aquatic life and/or amphibians. However, as discussed in preceding sections, chemicals in surface and subsurface soil could infiltrate groundwater. Chemicals entering the shallow aquifer could be transported east/southeast and discharged to surface-water bodies, adversely affecting aquatic life. The SLERA screened groundwater to determine if chemicals in this medium have the potential to adversely affect aquatic life and/or amphibian populations if groundwater discharges to surface water. It should be noted, however, that the screening of chemical concentrations in groundwater is extremely conservative and does not accurately estimate the (lower) concentrations expected to occur in surface water because it does not account for the mixing, dilution, and/or degradation of chemicals in groundwater and/or immediately following discharge to surface-water bodies.

A formal statement of the assessment endpoints is presented with corresponding measurement endpoints, in Table 2. The assessment endpoint for the receptor groups references an impact on survival, growth, and/or reproduction, as these represent ecologically relevant endpoints for these groups. The measurement endpoints in the SLERA were based on the ratio of a measured chemical concentration (or estimated dose) to a corresponding chemical concentration (or dose) determined from the scientific literature to be protective of that receptor.

3 Screening-Level Effects Evaluation

The screening-level-effects evaluation establishes chemical exposure levels (screening values) that represent conservative thresholds for adverse ecological effects. These values were compared to detected chemical concentrations (medium-specific screening values) or estimated chemical doses (ingestion screening values) to evaluate the potential for adverse effects to the potential receptor groups identified for evaluation in the SLERA. The following sections summarize the medium-specific and ingestion (wildlife) screening values selected for use in the SLERA.

3.1 Medium-Specific Screening Values

Medium-specific screening values were established for surface soil and groundwater. Based on the preliminary conceptual model, direct exposure to chemicals in onsite surface soil and groundwater (following discharge to surface water) are potentially complete exposure pathways associated with the Site.

Table 3 summarizes the sources of screening values used for surface soil and groundwater screening (surface water screening values were used for groundwater). When screening values for a medium were available from more than one of the listed sources, values were selected as prioritized in Table 3. When more than one potentially applicable screening value was available for a chemical from a single literature source, the lowest value was conservatively selected.

The surface soil screening values are summarized in Table 4 and surface water screening values are summarized in Table 5. The selected surface-water screening values for cadmium, chromium, copper, lead, nickel, and zinc are based on surface-water hardness (Table 5). A default hardness of 100 mg/L as CaCO₃ was used to develop the screening values for groundwater because directly applicable hardness data were not available for this site. Based on limitations in the toxicity screening values for amphibians, the screening values for aquatic life will be used as surrogate toxicity values to screen the potential for adverse effects to amphibians.

3.2 Ingestion Screening Values

Ingestion screening values were derived for the avian (American robin) and mammalian (white-footed mouse) species identified for evaluation in the SLERA. The risks to wildlife were only considered for chemicals that exceeded the direct-exposure screening values for terrestrial plants/soil invertebrates (i.e., COPCs), consistent with guidance provided by the USEPA Region II BTAG (personal communication, Pensak, 2002). Using this approach, it was assumed that chemical concentrations that did not exceed screening values for lower-trophic-level organisms are not high enough to represent a potential risk to higher-trophic-level species. Consistent with the conservative approach used in the SLERA, chemicals (detected or undetected) for which direct screening values were not available were also evaluated in the food-web models.

Toxicological information from the literature for wildlife species most closely related to the selected receptor species was used, where available, but was supplemented by laboratory studies of non-wildlife species (e.g., laboratory mice) where necessary. The ingestion screening values are expressed as milligrams of the chemical per kilogram body weight of the receptor per day (mg/kg-BW/day).

Growth and reproduction were emphasized as assessment endpoints since they are the most ecologically relevant to maintaining viable populations and because they are generally the most studied chronic toxicological endpoints for ecological receptors. If several chronic toxicity studies were available from the literature, the most appropriate study was selected for each receptor species based on the test species and study design, methodology, duration, and endpoint. No Observed Adverse Effect Levels (NOAELs) based on growth and reproduction were utilized, where available, as the primary screening values. When chronic NOAEL values were unavailable, estimates were extrapolated from chronic Lowest Observed Adverse Effect Levels (LOAELs) using a safety factor of 10. Ingestion screening values used in the SLERA are summarized in Table 6 for mammals and Table 7 for birds.

4 Screening-Level Exposure Estimate

This section presents the analytical data, the data groupings, exposure models, and input parameters that were used to estimate the potential exposure of ecological receptors to site-related chemicals.

4.1 Selection Criteria for Analytical Data

Surface soil (0 to 2 ft) and shallow groundwater data that were collected as part of the RI sampling activities described in the *Revised Work Plan, Martin Aaron Remedial Investigation/Feasibility Study, Volume I and II* (CH2M HILL, 2001) were reviewed for inclusion in the SLERA. The following criteria were used to select the specific analytical data to be used in estimating ecological receptor exposures in the SLERA:

- Data must have been validated by a qualified data validator using acceptable data-validation methods. Rejected (R flagged) values were not used in the SLERA. Data without qualifiers and data qualified as J, L, or K were treated as detected. Data qualified with a U or B were treated as non-detected.
- For groundwater data, total (unfiltered) chemical concentrations were used in the SLERA for conservatism. Only groundwater samples collected from less than 25 ft below ground surface (bgs) were evaluated in the SLERA. Deeper groundwater is considered less likely to receive site-related contaminants or to discharge to nearby surface-water bodies. Furthermore, the deeper groundwater contained fewer chemicals that could potentially affect aquatic life if deeper groundwater were to discharge to surface water. Samples collected during both the June (Round 1) and September 2002 (Round 2) sampling events were screened in the SLERA. The locations where the groundwater samples were collected are shown in Figure 3-2 of the RI.
- The SLERA did not include surface soil samples collected under paved surfaces or from within buildings because these media are inaccessible to potential ecological receptors. As a result, data from the following sample locations (Figure 3-1 of the RI) were not evaluated in the SLERA: SO202, SO203, SO206, SO207, SO208, SO209, SO210, SO213, SO401, SO402, SO403, SO404, SB13, SB47, SB71, SB85, SB106, SB108, and SB118.
- Maximum detection limits were conservatively used to estimate exposure to non-detected compounds. Non-detected chemicals with detection limits exceeding screening values represent an uncertainty in the ERA because these chemicals could be present at concentrations which exceed their screening value, but remain below their detection limit.
- For duplicate samples, the higher of two detected concentrations was used in the SLERA. In cases where there was only one detect, the detected value was used in the assessment. In cases where the sample and its duplicate were both non-detect, the higher of the two detection limits was conservatively used as the estimated concentration.

4.2 Data Groupings

Prior to summarization, data were grouped for estimating exposure concentrations at the Site. Surface soil data collected from the Martin Aaron property and from the New Jersey Port property were grouped separately for analysis (Figure 3-1 of the RI). Soil sample data were placed into separate groupings to characterize differences in chemical composition or concentration between these two areas. Shallow groundwater data were placed into two groups according to sample date (June and September 2002). These separate groupings will allow differences in chemical concentration between the sample dates to be identified.

A summary of the samples selected for use in the SLERA and the data groupings for each medium are presented in Table 8. Surface soil data are summarized in Table 9 for the Martin Aaron property and in Table 10 for the South Jersey Port Corporation property. Groundwater data are summarized in Table 11 for Round 1 and in Table 12 for Round 2. Each summary table provides the frequency of detection (with the number of rejected samples), the minimum, maximum, and mean concentrations (with standard deviation), and the sample ID of the maximum concentration for each chemical.

4.3 Exposure Point Concentrations

Conservative assumptions were used in the SLERA to estimate the exposure of ecological receptors to site-related chemicals in the environment. The following discuss the approach used to estimate exposure from both direct contact and food-web (ingestion) exposure pathways.

4.3.1 Direct Exposure

Maximum detected chemical concentrations (or maximum-detection limits for non-detected compounds) in each surface soil and groundwater grouping were compared to the medium-specific screening values derived in Section 3.0 to conservatively evaluate the potential for adverse ecological effects via direct exposure.

4.3.2 Food-Web Exposure

The food-web exposure models accounted for exposure to chemicals originating from surface soil by estimating chemical intake via the ingestion of food (i.e., tissue that had accumulated chemicals from soil) and the incidental ingestion of soil. Since there is no onsite source of drinking water, ingestion of chemicals via surface water was not evaluated.

Terrestrial wildlife (the white-footed mouse and American robin) exposure was modeled for chemicals detected in surface soils at concentrations exceeding direct-exposure screening values. Consistent with the conservative approach used in the SLERA, exposure was also modeled for chemicals (detected or non-detected) that did not have direct exposure screening values for surface soil and for non-detected chemicals with reporting limits exceeding direct exposure screening values.

Tissue concentrations were first modeled for terrestrial plants and soil invertebrates, which are prey for both the white-footed mouse and American robin. The specific methodologies used to estimate these tissue concentrations are outlined in the following subsections for each prey group. Consistent with the approach used for the direct exposure models, the

maximum detected surface soil concentrations (or the maximum detection limit of non-detected chemicals) were used to provide a conservative estimate of tissue concentrations. Separate food-web models were also run with data groupings for South Jersey Port Corporation surface soil and Martin Aaron surface soil.

Terrestrial Plants

Tissue concentrations in the aboveground vegetative portion of terrestrial plants were estimated by multiplying maximum measured surface soil concentrations for each chemical by the maximum soil-to-plant bioconcentration factors (BCFs) obtained from the literature. The literature BCF values used were based on root uptake from soil and represent the ratio of chemical concentrations between dry-weight soil and dry-weight plant tissue. These BCFs were converted to a dry-weight basis by dividing the wet-weight BCF by the estimated solids content for terrestrial plants (15 percent [0.15]); Sample et al., 1997).

For inorganic chemicals without literature-based BCFs, a soil-to-plant BCF of 1.0 was assumed. Use of this accumulation factor provides a conservative estimate of accumulation for most chemicals. For organic chemicals without literature-based BCFs, soil-to-plant BCFs were estimated using the algorithm provided in Travis and Arms (1988):

$$\log B_v = 1.588 - (0.578) (\log K_{ow})$$

where: B_v = Soil-to-plant BCF (unitless; dry-weight basis)
 K_{ow} = Octanol-water partitioning coefficient (unitless)

The log K_{ow} values used in the calculations were obtained mostly from USEPA (1995 and 1996). The soil-to-plant BCFs used in this SLERA are shown in Table 13. Calculations of BCFs for organic chemicals without literature-based values are presented in Attachment C.

Soil Invertebrates (Earthworms)

Tissue concentrations in soil invertebrates (earthworms) were estimated by multiplying the maximum-measured surface-soil concentration for each chemical by the maximum soil-to-earthworm BCFs or bioaccumulation factors (BAFs) obtained from the literature. BCFs were calculated by dividing the concentration of a chemical in the tissues of an organism by the concentration of that same chemical in the surrounding environmental medium (in this case, soil) without accounting for uptake via the diet. BAFs consider both direct exposure to soil and exposure via the diet. Since earthworms consume soil, BAFs are more appropriate values and were used preferentially in the food-web models. BAFs based on depurated analyses (soil was purged from the gut of the earthworm prior to analysis) were given preference over undepurated analyses since direct ingestion of soil is accounted for separately in the food-web model.

The BCF and BAF values used were based on the ratio between dry-weight soil and dry-weight earthworm tissue. Literature values based on that ratio were converted to a dry-weight basis by dividing the wet-weight BCF and BAF by the estimated solids content for earthworms (16 percent [0.16]); USEPA, 1993). For chemicals without available measured BAFs or BCFs, an earthworm BAF of 1.0 was assumed. The soil-to-earthworm accumulation factors used in the SLERA are also shown in Table 13.

4.4 Dietary Intakes

Once chemical concentrations in food items were estimated, dietary intakes for each receptor species were calculated using the following formula (modified from USEPA (1993)):

$$DI_x = \frac{[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)]}{BW}$$

where: DI_x = Dietary intake for chemical x (mg chemical/kg body weight/day)
 FIR = Food ingestion rate (kg/day, dry-weight)
 FC_{xi} = Concentration of chemical x in food item i (mg/kg, dry weight)
 PDF_i = Proportion of diet composed of food item i (dry weight basis)
 SC_x = Concentration of chemical x in soil (mg/kg, dry weight)
 PDS = Proportion of diet composed of soil (dry weight basis)
 BW = Body weight (kg, wet weight)

Receptor-specific values used as inputs to this equation are provided in Table 14. Consistent with the approach for the SLERA, the minimum body-weight and maximum food-ingestion rates from the scientific literature were used for each receptor to obtain a conservative estimate of dietary intake. Further, for the SLERA it was conservatively assumed that all receptors spend 100 percent of their time on the site (i.e., an area-use factor of 1.0 was assumed). Example spreadsheets for the food-web model calculations are shown in Attachment D for the Martin Aaron Site.

5 Screening-Level Risk Calculations

The screening-level risk calculation is the final step of the SLERA. In this step, maximum exposure concentrations (abiotic media) or exposure doses (upper-trophic-level receptor species) are compared with the corresponding screening values to derive screening risk estimates. The outcome of this step is a list of chemicals of potential concern (COPCs) for each media-pathway-receptor combination evaluated or the elimination of chemicals from further consideration based on the conclusion that they are unlikely to adversely affect the selected ecological receptors.

COPCs were selected using the hazard quotient (HQ) method. HQs were calculated in the SLERA by dividing the maximum detected chemical concentration in the medium being evaluated by the corresponding medium-specific screening value (derived in Section 3.0) or by dividing the maximum estimated exposure dose by the corresponding ingestion screening value (derived in Section 3.0). Chemicals with HQs greater than (or equal to) 1.0 are considered COPCs. In the SLERA, chemicals without screening values were also considered COPCs. Uncertainties associated with these chemicals are further discussed in Section 6.0 of the SLERA.

HQs greater than (or equal to) one indicate the potential for risk since the chemical exposure concentration or dose meets/exceeds a toxic threshold represented by the screening value. However, screening values and exposure estimates in the SLERA were derived using intentionally conservative assumptions such that HQs greater than (or equal to) one do not necessarily indicate that risks are present or impacts are occurring. HQs greater than (or equal to) one instead identify chemical-pathway-receptor combinations requiring further evaluation. Following the same reasoning, HQs that are less than one indicate that risks are very unlikely, enabling a conclusion of no unacceptable risk to be reached with a high level of confidence and negating the need for further evaluation of that chemical-pathway-receptor combination.

5.1 Direct Exposure

5.1.1 Surface Soil

Martin Aaron Property. Table 15 summarizes the direct exposure COPCs for the Martin Aaron Property surface soil grouping. The results of these comparisons are summarized below.

SVOCs

HQs are ≥ 1.0 for 25 SVOCs. Seventeen of these exceedances are based on comparison of the maximum detected concentrations to screening values, while eight of the exceedances are based on comparison of maximum reporting limits (i.e., non-detects) to screening values. HQs for these SVOCs range from 1.1 for hexachlorocyclopentadiene to 2,900 for fluoranthene. Ten detected and 21 non-detected SVOCs did not have screening values and HQs were not calculated for these chemicals.

Pesticides/PCBs

HQs are ≥ 1.0 for 14 pesticides/PCBs. Ten of these exceedances are based on comparison of maximum detected concentrations to screening values (three PCB mixtures and seven pesticides), while the other four exceedances (all PCBs) are based on comparison of maximum reporting limits (i.e., non-detects) to screening values. HQs for these pesticides/PCBs range from 1.2 for endrin ketone to 150 for DDE. Six detected and one non-detected pesticide/PCBs did not have screening values and HQs were not calculated for these chemicals.

VOCs

HQs are ≥ 1.0 for 19 VOCs. Eleven of these exceedances are based on comparison of maximum detected concentrations to screening values, while eight are based on comparison of maximum reporting limits (i.e., non-detects) to screening values. HQs for these VOCs range from 1.1 for vinyl chloride to 562 for benzene. Thirteen detected and seven non-detected VOCs did not have screening values and HQs were not calculated for these chemicals.

Inorganics

HQs are ≥ 1.0 for 18 inorganics. Sixteen of these exceedances are based on comparison of maximum detected concentrations to screening values, while two (antimony and thallium) are based on comparison of the maximum reporting limit (i.e., non-detect) to screening values. HQs for these inorganics range from 1.4 for thallium to 2,700 for chromium. Three detected inorganics did not have screening values and HQs were not calculated for these chemicals.

South Jersey Port Corporation Property Table 16 summarizes the direct exposure COPCs for the South Jersey Port Corporation surface-soil grouping. The results of these comparisons are summarized below.

SVOCs

HQs are ≥ 1.0 for 32 SVOCs. Half of these exceedances are based on comparison of maximum detected concentrations to screening values, and half are based on comparison of reporting limits (i.e., non-detects) to screening values. HQs for these SVOCs range from 1.2 for diethyl phthalate to 3,400 for phenanthrene. Four detected and 27 non-detected SVOCs did not have screening values and HQs were not calculated for these chemicals.

Pesticides/PCBs

There are no exceedances for pesticides or PCBs based on comparisons with detected concentrations or maximum reporting limits. Three detected and four non-detected pesticide/PCBs did not have screening values and HQs were not calculated for these chemicals.

VOCs

Benzene is the only VOC with a HQ ≥ 1.0 (HQ of 1.9), but this exceedance is based on the comparison of the maximum detection limit for benzene to its screening value. Two detected and 17 non-detected VOCs did not have screening values and HQs were not calculated for these chemicals.

Inorganics

HQs are ≥ 1.0 for 14 inorganics. Thirteen of these exceedances are based on comparison of the maximum detected concentrations to screening values, while thallium is based on comparison of the maximum reporting limit (i.e., non-detect) to its screening value. HQs for these inorganics range from 1.0 for silver to 473 for chromium. Two detected and one non-detected inorganics did not have screening values and HQs were not calculated for these chemicals.

Surface Soil Summary The following conclusions were made for surface soil based on consideration of the above direct exposure comparisons:

- PAHs were the predominant SVOC COPCs in both Martin Aaron Property and South Jersey Port Corporation surface soils, and there was no apparent difference in PAH concentrations between these two areas.
- Pesticides, PCBs, and several VOCs were identified as COPCs in Martin Aaron Property surface soils, while only benzene was identified as a COPC in the South Jersey Port Corporation surface soils.
- Similar inorganic chemicals were identified as COPCs in both the Martin Aaron Property and the South Jersey Port Corporation surface soils, though concentrations of these inorganic chemicals were higher in the Martin Aaron Property surface soils than in South Jersey Port Corporation surface soils.

5.1.2 Groundwater

Round 1 (June 2002). Table 17 summarizes the direct exposure COPCs for groundwater based on comparison of chemical concentrations detected during the Round 1 sampling event (June of 2002) to surface water screening values. The results of these comparisons are summarized below.

SVOCs

HQs are ≥ 1.0 for 24 SVOCs. Four of these exceedances are based on comparison of maximum detected concentrations to screening values, while 20 are based on comparison of maximum reporting limits (i.e., non-detects) to screening values. HQs for these SVOCs range from 1.0 for 2-nitrophenol to greater than 21,000 for benzo[a]pyrene. It should be noted, however, benzo[a]pyrene was not detected and the HQ for this chemical was based on the maximum reporting limit. Five detected and 22 non-detected SVOCs did not have screening values and HQs were not calculated for these chemicals.

Pesticides/PCBs

HQs are ≥ 1.0 for 16 pesticides/PCBs. Four of these exceedances are based on comparison of maximum detected concentrations (all pesticides) to screening values, while 12 (pesticide and PCBs) are based on comparison of reporting limits (i.e., non-detects) to screening values. HQs for pesticides and PCBs range from 2.6 for heptachlor to 5,000 for toxaphene. It should be noted, however, toxaphene was not detected and the HQ for this chemical was based on the maximum reporting limit. One detected and two non-detected pesticide/PCBs did not have screening values and HQs were not calculated for these chemicals.

VOCs

HQs are ≥ 1.0 for nine VOCs, all of which are based on the comparison of maximum detected concentrations to screening values. HQs for these VOCs range from 1.0 for 1,2-dichlorobenzene to 20.7 for carbon disulfide. Six detected and six non-detected VOCs did not have screening values and HQs were not calculated for these chemicals.

Inorganics

HQs are ≥ 1.0 for 16 total (unfiltered) inorganics. Fourteen of these exceedances are based on comparison of maximum detected concentrations to screening values, while the remaining two (beryllium and silver) are based on comparison of the maximum reporting limits (i.e., non-detects) to screening values. HQs for these inorganics range from 1.2 for nickel to 6,500 for barium. Four detected inorganics did not have screening values and HQs were not calculated for these chemicals.

Round 2 (September 2002). Table 18 summarizes the direct exposure COPCs for groundwater based on comparison of chemical concentrations detected during the Round 2 sampling event (September of 2002) to surface water screening values. The results of these comparisons are summarized below.

SVOCs. HQs are ≥ 1.0 for 11 SVOCs. Three of these exceedances are based on comparison of maximum detected concentrations to screening values, while eight are based on comparison of maximum reporting limits (i.e., non-detects) to screening values. HQs for these SVOCs range from 1.0 for hexachlorocyclopentadiene to 357 for benzo[a]pyrene. It should be noted, however, benzo[a]pyrene was not detected and the HQ for this chemical was based on the maximum reporting limit. Four detected and 23 non-detected SVOCs did not have screening values and HQs were not calculated for these chemicals.

Pesticides/PCBs. HQs are ≥ 1.0 for 16 pesticides or PCBs. However, only one exceedance is based on the comparison of the maximum detected concentration to its screening value (dieldrin). The other 15 exceedances are based on comparison of the maximum reporting limits (i.e., non-detects) to screening values. HQs for these pesticides and PCBs range from 2.3 for alpha-chlordane to 5,000 for toxaphene. It should be noted, however, toxaphene was not detected and the HQ for this chemical was based on the maximum reporting limit. Three non-detected pesticide/PCBs did not have screening values and HQs were not calculated for these chemicals.

VOCs. HQs are ≥ 1.0 for four VOCs. Three of these exceedances are based on comparison of the maximum detected concentrations to screening values, while one (carbon tetrachloride) is based on comparison of the maximum reporting limit (i.e., non-detect) to its screening value. HQs for these VOCs range from 1.0 for carbon tetrachloride to 5.5 for 1,1,1-trichloroethane. Eight detected and four non-detected VOCs did not have screening values and HQs were not calculated for these chemicals.

Inorganics. HQs are ≥ 1.0 for 17 total (unfiltered) inorganics. Fifteen of these exceedances are based on comparison of the maximum detected concentrations to screening values, while two (beryllium and silver) are based on comparison of maximum reporting limits (i.e., non-detects) to screening values. HQs for these inorganics range from 1.0 for mercury to 9,125 for barium. Four detected inorganics did not have screening values and HQs were not calculated for these chemicals.

Groundwater Summary. The following conclusions were made for groundwater based on consideration of the above direct exposure comparisons:

- Several SVOCs, pesticides, and PCBs were identified as COPCs in groundwater collected during both the Round 1 and 2 sampling events..
- Several VOCs were identified as COPCs in groundwater samples collected during the Round 1 and Round 2 sampling events, though more VOCs were detected, at generally higher concentrations, during the Round 1 sampling event.
- Similar inorganic chemicals were identified as COPCs in groundwater collected during both the Round 1 and Round 2 sampling events, though inorganic chemicals were detected at generally higher concentrations during the Round 1 sampling event.

Although the concentrations of some organic and inorganic chemicals in groundwater exceed ecological screening values, the overall potential for adverse effects to ecological receptors from the discharge of site-related groundwater to surface water is considered low. The direct comparison of maximum chemical concentrations in groundwater represents an extremely conservative initial screen of potential risk that does not account for actual exposure concentrations in surface water. Several factors must be considered when extrapolating the results of this initial screen into making conclusions about the potential for ecological risk. First, as discussed in Section 6, organic and inorganic chemical concentrations (within range of the monitoring well network) decrease rapidly when moving away from the source location. These data suggest that chemicals in groundwater are localized at the site and are not migrating towards locations of potential discharge. Further, most organic chemicals exceeded ecological screening values at a low frequency, indicating the limited presence of these chemicals in groundwater at concentrations that could adversely affect aquatic life (see Tables 17 and 18). Coupled with contaminant degradation trends, which indicate that organic chemical concentrations in groundwater are unstable and decreasing due to biotic and abiotic natural attenuation, these data further suggest that organic chemicals have a limited potential to reach locations of potential discharge. Even if chemicals were to discharge to surface water, dilution and (in the case of VOCs) volatilization would rapidly decrease potential exposure concentrations immediately following release to surface water. Based on these lines of evidence, it is considered unlikely that site-related chemicals in groundwater have the potential to adversely affect aquatic life.

5.2 Food-Web Exposure

5.2.1 Martin Aaron Property

Table 19 summarizes the food-web exposure COPCs for the Martin Aaron Property surface soil grouping. For white-footed mouse, the HQs are ≥ 1.0 for 12 inorganic chemicals, two pesticides, five PCB compounds, and two SVOCs. For the American robin, the HQs are ≥ 1.0 for 12 inorganic chemicals, four pesticides, seven PCBs, and two SVOCs. There are no HQs greater than 1.0 for VOCs for either white-footed mouse or American robin. As shown on Table 19, there were a number of detected and non-detected chemicals that did not have screening values and HQs were not calculated for these chemicals.

5.2.2 South Jersey Port Corporation Property

Table 20 summarizes the food-web exposure COPCs for the South Jersey Port Corporation surface-soil grouping. For white-footed mouse, HQs are ≥ 1.0 for 10 inorganic chemicals and five SVOCs. For the American robin, HQs are ≥ 1.0 for eight inorganic chemicals and three SVOCs (hexachlorobenzene and pentachlorophenol). There are no HQs ≥ 1.0 for pesticides, PCBs, or VOCs for either white-footed mouse or American robin. As shown on Table 20, there were a number of detected and non-detected chemicals that did not have screening values and HQs were not calculated for these chemicals.

Food Web Summary. The following conclusions were made for food-web exposure risks based on consideration of the above comparisons:

- Three SVOCs were identified as COPCs for terrestrial wildlife at the Martin Aaron Property, while five SVOCs were identified as COPCs for terrestrial wildlife at the South Jersey Port Corporation. However, three of these five chemicals were based on doses estimated from reporting limits and it is unclear if these chemicals are actually present in Site surface soil.
- Several pesticides and PCBs were identified as COPCs for terrestrial wildlife at the Martin Aaron Property, while none were identified as indicating a potential risk to wildlife at the South Jersey Port Corporation. However, risks indicated for many of the PCB compounds were based on doses estimated from reporting limits and it is unclear if these chemicals are actually present in surface soil.
- VOCs were not identified as a potential risk to terrestrial wildlife at either the Martin Aaron Property or the South Jersey Port Corporation, which is an expected outcome since VOCs do not bioaccumulate.
- A number of inorganic chemicals were identified as COPCs for terrestrial wildlife at both the Martin Aaron Property and the South Jersey Port Corporation, though the concentrations of these chemicals (and magnitude of potential risk) were generally higher in the Martin Aaron Property surface soils than in the South Jersey Port Corporation surface soils.

6 Uncertainties

Uncertainties are present in all risk assessments because of the limited available data and the need to make certain assumptions and extrapolations based on incomplete information. The key uncertainties associated with the calculation of risk in this SLERA are discussed in this section. Since very conservative assumptions were used in the exposure and effects assessments, these uncertainties are more likely to result in overestimation, rather than underestimation, of the likelihood and magnitude of risks to ecological receptors. The SLERA results should be interpreted in the context of the uncertainties discussed within this section. These primary uncertainties are attributable to the following:

- Non-detected Chemicals Exceeding Screening Values and Chemicals Without Screening Values—Non-detected chemicals with maximum-detection limits exceeding screening values and non-detected chemicals without screening values were considered COPCs, based on the conservative approach used in the SLERA. There is uncertainty associated with these chemicals. Non-detected chemicals with detection limits exceeding screening values may, for example, be present at a concentration below the detection limit but above the screening value, in which case they could have the potential to adversely affect ecological receptors. Conversely, these chemicals may not be present within all site media. For example, HQs for non-detected chemicals in surface soils ranged up to 220 for 2,4-dichlorophenol for Martin Aaron soils and up to 2,400 for 2,4-dichlorophenol for South Jersey Port soils. HQs for non-detected chemicals in groundwater ranged up to >21,000 for benzo[a]pyrene for Round 1 groundwater and up to 5,000 for toxaphene for Round 2 groundwater. There is uncertainty associated with these chemicals and it cannot be definitively determined if they occur onsite at environmentally significant concentrations. However, based on the bias of samples to potential source areas, it is unlikely that chemicals potentially posing a risk to ecological receptors would not have been detected. However, there remains some uncertainty associated with these chemicals.

Chemicals detected but that did not have screening values also could not be quantitatively evaluated, and there is uncertainty associated with the potential for ecological receptors to be adversely affected by these chemicals. For surface soils, there are a total of 31 SVOCs, 7 pesticides/PCBs, 20 VOCs, and three inorganic chemicals that were detected but did not have direct-exposure screening values. For groundwater, there are a total of 27 SVOCs, 3 pesticides or PCBs, 12 VOCs, and 4 inorganic chemicals that were detected but did not have direct-exposure screening values.

- Soil and Water Direct Exposure Screening Values—There is uncertainty associated with the form and bioavailability of inorganic chemicals in soil and water. In the absence of site-specific information, the form and bioavailability of the inorganic chemicals at this Site were assumed to be the same as the form and bioavailability of the chemicals used to develop the literature-based screening values. In many cases, however, the most bioavailable/toxic form of a chemical was conservatively used to develop the literature-based screening value. Environmental factors (e.g., pH, moisture, temperature, and

microbial activity) often act to make chemicals less bioavailable/toxic than those used to develop the screening values. Surface water hardness, for example, can influence the form/bioavailability of some inorganic chemicals. Based on the absence of site-specific information, a relatively conservative default hardness value of 100 mg/L as CaCO₃ was used in the SLERA to develop the toxicity-screening values for the hardness-based chemicals. Risks will be overestimated if hardness is greater than 100 mg/L as CaCO₃. Although considered less likely, risks could have been underestimated if hardness values are less than 100 mg/L. The conservative approach used in developing the screening values is usually expected to overestimate risk.

- **Ingestion Screening Values**—Toxicity data for many chemicals were sparse or lacking for the selected receptor species, requiring the extrapolation of data from other wildlife species or from laboratory studies of non-wildlife species. This is a typical limitation based on the absence of toxicity data for many wildlife species. The uncertainties associated with toxicity extrapolation were, however, minimized through the careful selection of representative surrogate test species. The factors considered in selecting a surrogate species to represent another receptor species (or group of species) were taxonomic relatedness, trophic level, foraging method, and similarity of diet.
- Another uncertainty related to the derivation of ingestion-screening values applies to metals. Most of the toxicological studies on which the ingestion-screening values for metals were based used forms of the metal (such as salts) that have high water solubility and bioavailability to receptors. Since the analytical samples on which site-specific exposure estimates were based measured total metal concentration (regardless of form), and the highly bioavailable forms are expected to compose only a fraction of the total metal concentration, potential risks to wildlife are likely to be overestimated for many metals.
- A third source of uncertainty associated with the derivation of ingestion-screening values concerns the use of uncertainty factors. For example, LOAEls were extrapolated to NOAELs using an uncertainty factor of 10. This approach is likely to be conservative since Dourson and Stara (1983 cited in USEPA 1997) determined that 96 percent of the chemicals included in a data review had LOAEL-to-NOAEL ratios of five or less. The use of an uncertainty factor of 10, although potentially conservative, also serves to counter some of the uncertainty associated with interspecies extrapolations, for which a specific uncertainty factor was not used.
- **Chemical Mixtures**—Information on the ecotoxicological effects of chemical interactions is generally lacking, which required (as is standard for ecological risk assessments) that chemicals be evaluated on a compound-by-compound basis during the comparison to screening value. This could result in an underestimation of risk (if there are additive or synergistic effects among chemicals) or an overestimation of risks (if there are antagonistic effects among chemicals).
- **Food-Web Exposure Modeling**—Chemical concentrations in terrestrial food items (e.g., plants and earthworms) were modeled from measured media concentrations and not directly measured. The use of generic, literature-derived exposure models and bioaccumulation factors introduces some uncertainty into the resulting estimates. Consistent with the SLERA approach, the selected values and employed methodology

were intended to provide a conservative estimate of potential food-web exposure concentrations and risks are likely to have been overestimated by the food-web models used in this assessment.

Another source of uncertainty is the use of default assumptions for exposure parameters such as BCFs and BAFs. Although BCFs or BAFs for many bioaccumulative chemicals were readily available from the literature and used in the SLERA, a default factor of 1.0 was used to estimate the concentration of chemicals in earthworms when literature-based values were not available. The assumption that the chemical body burden in the earthworm is the same as in the abiotic media is a conservative assumption for most chemicals, particularly for chemicals that are not known to bioaccumulate to any significant degree.

The SLERA exposure parameters used for the receptors were very conservative, with the objective of providing an upper-bound risk estimate. The use of maximum ingestion rates and minimum body weights in the SLERA results in a conservative estimate of exposure. In addition, area-use factors were assumed to equal one. This is a conservative assumption, since each upper-trophic-level receptor species could spend time foraging off-site in unimpacted areas or in areas where chemical concentrations are expected to be significantly lower.

- **Consideration of Background Concentrations**—The SLERA does not account for the non site-related concentrations of chemicals in the environment. However, some inorganic chemicals occurring at concentrations above screening values for direct exposure comparisons, or indicating potential risk via the food-web models, may reflect non site-related concentrations or naturally occurring concentrations. If inorganic chemicals are present at concentrations that do not exceed non site-related concentrations, and the risk models indicate a potential risk, it is reasonable to assume the indicated risks are not site-related. This indication of risk may reflect naturally elevated regional concentrations, in which case ecological communities would be expected to have adapted to these levels. The indicated risks may also reflect the conservative exposure or toxicity assumptions used in the SLERA, and that risks may have been overestimated by the food web models. Finally, chemicals present in soil may reflect, at least in part, chemicals that are present at elevated levels, but which have originated from non site-related sources. This latter scenario is particularly relevant to organic chemicals such as PAHs, which are ubiquitous in the environment.
- **Exposure to Groundwater**—Chemical concentrations in undiluted, unfiltered groundwater were used as a proxy for chemical concentrations in surface water (based on the potential for groundwater to discharge to surface water). Although this approach is consistent with that used in the SLERA, it is highly conservative and likely to overestimate exposure concentrations for ecological receptors.

7 Conclusions

The SLERA results indicate the presence of COPCs in both the Martin Aaron Site Property and the New Jersey Port Corporation surface soils. Potential risks were indicated to terrestrial plants and soil invertebrates from direct exposure to PAHs and inorganic chemicals in both areas, although inorganic chemical concentrations (and resulting potential risks) were generally higher in the Martin Aaron Property soils. Several pesticides, PCBs, and VOCs were also identified as direct exposure COPCs in the Martin Aaron Property soils.

Potential risks were indicated for terrestrial wildlife from inorganic chemicals in the Martin Aaron Property and New Jersey Port Corporation surface soils and from SVOCs, pesticides, and PCBs primarily for Martin Aaron Property surface soils. However, many of these latter risks were based on doses estimated from exposure limits, and it is uncertain if these compounds are actually present in surface soil at concentrations that could represent a potential ecological risk.

Several VOCs and inorganic chemicals in groundwater were detected at concentrations exceeding ecological screening values, suggesting they could represent a potential risk to ecological receptors if they were to discharge to surface water. The SLERA also indicated the possible presence of several SVOCs, pesticides, and PCBs in groundwater at concentrations exceeding ecological screening values.. This was based on comparison of screening values to maximum reporting limits and it is uncertain if these chemicals were actually present in groundwater at concentrations that could represent a potential ecological risk. However, chemicals in groundwater could represent a potential risk to ecological receptors only if they discharge to a viable aquatic habitat. This pathway has not been established and available information suggests that elevated organic and inorganic chemical concentrations are localized to the area immediately adjacent to the site and that most organic chemicals are present at a low frequency in groundwater and have concentrations that are decreasing through biological and abiotic natural attenuation mechanisms. Furthermore, even if discharging to surface water, dilution in surface water would reduce these chemical concentrations immediately following discharge to surface water. These lines of evidence suggest that groundwater has very little potential to adversely affect aquatic life and does not warrant further consideration in the ERA.

In conclusion, several COPCs were identified via direct exposure screening (surface soil) and via food-web exposure modeling (surface soil) using the very conservative SLERA screening process. Further consideration of these potential ecological risks may be warranted. It should be recognized, however, that habitats on both the Martin Aaron Property and the South Jersey Port Corporation parcel have been highly disturbed by past activities and both areas provide only very limited viable habitat for ecological receptors.

8 References

- Agency for Toxic Substances and Disease Registry (ATSDR) *Toxicological Profile for Polycyclic Aromatic Hydrocarbons (PAHs)*. August 1995a.
- ATSDR. *Toxicological Profile for PCBs*. August 1995b.
- ATSDR. *Toxicological Profile for N-Nitrosodiphenylamine*. 1990
- ATSDR. *Toxicological Profile for Cobalt*. 1992
- ATSDR *Toxicological Profile for Silver*. Draft. 1990.
- ATSDR. *Toxicological Profile for Hexachlorobenzene*. Draft. 1989.
- Baes, C.F. III, R.D. Sharp, A.L. Sjoreen, and R.W. Shor. *A review and analysis of parameters for assessing transport of environmentally released radionuclides through agriculture*. Oak Ridge National Laboratory. ORNL-5786. 148 pp. 1984.
- Bechtel Jacobs. *Empirical models for the uptake of inorganic chemicals from soil by plants*. Prepared for U.S. Department of Energy. BJC/OR-133. September, 1998.
- Beyer, W. N., and Gish, C.D. Persistence in Earthworms and Potential Hazard to Birds of Soil Applied DDT, Dieldrin, and Heptachlor. *Journal of Applied Ecology*, 17, pp. 295-307. 1980.
- Beyer, W.N. and C. Stafford. Survey and evaluation of contaminants in earthworms and in soil derived from dredged material at confined disposal facilities in the Great Lakes Region. *Environmental Monitoring and Assessment*. 24:151-165.1993.
- Beyer, W.N., E.E. Connor, and S. Gerould. Estimates of soil ingestion by wildlife. *Journal of Wildlife Management*. 58:375-382. 1994.
- Beyer, W.N., G.H. Heinz, and A.W. Redmon-Norwood. *Environmental contaminants in wildlife: interpreting tissue concentrations*. Lewis Publishers, Boca Raton, FL. 494 pp. 1996.
- Buchman, M.F. *NOAA Screening Quick Reference Tables*. NOAA HAZMAT Report 99-1, Seattle, WA. 12 pp. 1999.
- CH2M HILL. *Revised Work Plan, Martin Aaron Remedial Investigation/Feasibility Study, Volume I and II*. November 2001.
- Coulston, F. and A.C. Kolbyne, Jr. (eds). *Interpretive Review of the Potential Adverse Effects of Chlorinated Organic Chemicals on Human Health and the Environment*. Regulatory Toxicology and Pharmacology. 20:S1-S1056. 1994.
- Diaz, G.J., R.J. Julian, and E.J. Squires. Lesions in broiler chickens following experimental intoxication with cobalt. *Avian Diseases*. 38:308-316. 1994.
- Dourson M. L., and J. F. Stara. Regulatory History and Experimental Support of Uncertainty (Safety) Factors. *Regul Toxicol Pharmacol* 3(1983): 224-38. 1983.

- Eisler, R. 1989. *Pentachlorophenol Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review*. U.S. Fish and Wildlife Service Biological Report 85(1.17), Contaminant Hazard Reviews Report No. 17. 72 pp.
- Grimes, J. and M. Jaber. *Para-dichlorobenzene: An Acute Oral Toxicity Study With the Bobwhite, Final Report*. Prepared by Wildlife International Ltd.—Easton, MD under project No. 264-101 and submitted to Chemical Manufacturers Association, Washington, DC, report dated July 19, 1989.
- Hill, E.F. and M.B. Camardese. *Lethal Dietary Toxicities of Environmental Contaminants and Pesticides to Coturnix*. U.S. Fish and Wildlife Service Technical Report 2. 1986.
- Hill, E.F., R.G. Heath, J.W. Spann, and J.D. Williams. *Lethal Dietary Toxicities of Environmental Pollutants to Birds*. U.S. Fish and Wildlife Service Special Scientific Report—Wildlife No. 191, Washington D.C. 1975.
- International Programme on Chemical Safety (IPCS). *Environmental Health Criteria 156—Hexachlorobutadiene*. World Health Organization, Geneva. 1994.
- Kimball & Associates. *Draft Remedial Investigation Report for Martin Aaron Site Camden City, Camden County, New Jersey*. 2000.
- Levey, D.J. and W.H. Karasov. Digestive responses of temperate birds switched to fruit or insect diets. *Auk*. 106:675-686. 1989.
- Martin, A. C., H. S. Zim, and A. L. Nelson. *American Wildlife And Plants: A Guide to Wildlife Food Habits*. New York: Dover. 1951.
- McCollister, D.D., P.T. Lockwood, and V.K. Rowe. Toxicologic information on 2,4,5-trichlorophenol. *Toxicology and Applied Pharmacology*. 3:63-70. 1961.
- McLane, M.A.R. and L.C. Hall. DDE thins screech owl eggshells. *Bulletin of Environmental Contamination and Toxicology*. 8:65-68. 1972.
- Menzie, C.A., D. E. Burmaster, J. S. Freshman, and C. A. Callahan. *Assessment of Methods for Estimating Ecological Risk in the Terrestrial Component: A Case Study at the Baird & McGuire Superfund Site in Holbrook, Massachusetts*. *Environmental Toxicology and Chemistry*. 11 (1992):245–60. 1992.
- National Academy of Sciences (NAS). *Mineral tolerance of domestic animals*. National Research Council, Committee on Animal Nutrition, Board on Agriculture and Renewable Resources, Commission on Natural Resources. Washington, D.C. 1980.
- New Jersey Department of Environmental Protection (NJDEP). *Surface Water Quality Standards* (N.J.A.C. 7:9B, April, for FW2 waters). 1998.
- NTP (National Toxicology Program). *Effect of dietary restriction on toxicology and carcinogenesis studies of butyl benzyl phthalate (CAS No. 85-68-7) in F344/N rats and B6C3F1 mice (feed studies)*. Technical Report Series No. 458, NTP TR458. Prepared by U.S. Department of Health and Human Services. 1997.

- NTP. *Toxicology and carcinogenesis studies of 2,4-dichlorophenol in F344/N rats and B6C3F1 mice (feed studies)*. Technical Report Series No. 353. Research Triangle Park, NC: U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health. 1989.
- Opresko, D.M., B.E. Sample, and G.W. Suter II. *Toxicological benchmarks for wildlife*. Environmental Restoration Division, ORNL Environmental Restoration Program. ES/ER/TM-86. 1993.
- Patton, J.F. and M.P. Dieter. *Effects of Petroleum Hydrocarbons on Hepatic Function in the Duck*. Comp. Biochem. Physiol. 65C:33-36. 1980.
- Pensak, M. Personal communication between Mindy Pensak (USEPA Region II BTAG) and Mike Elias (CH2M HILL). December 30, 2002.
- Rigdon, R.H. and J. Neal. *Absorption and Excretion of Benzpyrene Observation in the Duck, Chicken, Mouse, and Dog*. Texas Reports on Biology and Medicine. 21(2):247-261. 1963.
- Roberts, B.L. and H.W. Dorough. Hazards of chemicals to earthworms. *Environ. Toxicol. Chem.* 4:307-323. 1985.
- Sample, B. E., J. J. Beauchamp, R. A. Efroymson, and G. W. Suter II. *Development and Validation of Bioaccumulation Models for Small Mammals*. Environmental Restoration Division, ORNL Environmental Restoration Program. ES/ER/TM-219. 1998.
- Sample, B.E. and G.W. Suter II. *Estimating exposure of terrestrial wildlife to contaminants*. Environmental Restoration Division, ORNL Environmental Restoration Program. ES/ER/TM-125. 1994.
- Sample, B.E., D.M. Opresko, and G.W. Suter II. *Toxicological Benchmarks for Wildlife: 1996 Revision*. Environmental Restoration Division, ORNL Environmental Restoration Program. ES/ER/TM-86/R3. 1996.
- Sample, B.E., M.S. Aplin, R.A. Efroymson, G.W. Suter II, and C.J.E. Welsh. *Methods and tools for estimation of the exposure of terrestrial wildlife to contaminants*. Environmental Sciences Division, Oak Ridge National Laboratory. ORNL/TM-13391. 1997.
- Silva, M., and J. A. Downing. CRC handbook of mammalian body masses CRC Press, Boca Raton, FL. 359 pp. 1995.
- Travis, C.C. and A.D. Arms. Bioconcentration of organics in beef, milk, and vegetation. *Environmental Science and Technology*. 22:271-274. 1998.
- Tucker, R.K. and D.G. Crabtree. *Handbook of Toxicity of Pesticides to Wildlife*. U.S. Fish and Wildlife Service Research Publication 84. 131 pp. 1970.
- U.S. Department of Energy (USDOE). *Preliminary Remediation Goals for Ecological Endpoints*. Oak Ridge National Laboratory, Oak Ridge, TN. 50 pp. 1997.
- U.S. Environmental Protection Agency (USEPA). *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments*. Interim Final. 1997.

- USEPA. *Health Assessment Document for Hexachlorocyclopentadiene*. EPA/600/8-84/001F. 1984.
- USEPA. *National Recommended Water Quality Criteria*: 2002. EPA 822-R-02-047. 2002.
- USEPA. *Wildlife exposure factors handbook. Volume I of II*. EPA/600/R-93/187a. 1993.
- USEPA. *Ecotox thresholds*. Eco Update, Volume 3, Number 2. EPA/540/F-95/038. 12 pp. 1996.
- USEPA. *Internal report on summary of measured, calculated and recommended log Kow values*. Environmental Research Laboratory, Athens, U.S. Environmental Protection Agency. *Revised Region III BTAG Screening Levels*. Memorandum from R.S. Davis to Users. August. 1995.
- USEPA. *Supplemental guidance to RAGS: Region 4 ecological risk assessment bulletins*. August. 1999.
- Van Gestel, C.A.M. and W. Ma. Toxicity and bioaccumulation of chlorophenols in earthworms, in relation to bioavailability in soil. *Ecotoxicology and Environmental Safety*. 15:289-297. 1988.

Tables

303121

TABLE 1
Rare Species Within the Vicinity of the Martin Aaron Site
Martin Aaron Site, Camden, NJ

Vertebrates Bog Turtle	Peregrin Falcon
Invertebrates Triangle Floater Yellow Lampmussel Eastern Lampmussel Tidewater Mucket	Eastern Pondmussel West Virginia White Gray Comma Checkered White
Vascular Plants Sensitive Joint-Vetch Pale Indian Plantain Red Milkweed Low Rough Aster Estuary Burr-Marigold Blunt-Lobe Grape Fern Marsh Water-starwort Erect Bindweed Barratt's Sedge Bottle-Shaped Sedge Red Goosefoot Long-Bract Green Orchid Smartweed Dodder Lancaster Flat Sedge Rough Flatsedge Carolina Whitlow-Grass	Parker's Peppermint Dog-Fennel Thoroughwort Pine Barren Gentian Swamp-Pink Bouquet Mud-Plantain Golden Seal Minute Duckweed Sandplain Flax Small-Flower Halfchaff Sedge Nuttall's Mudwort Pale Beaked-Rush Saltmarsh Bulrush Fragrant Ladies'-Tresses Hairy-Joint Meadow-Parsnip Beaked Cornsalad

TABLE 2
Preliminary Assessment Endpoints, Measurement Endpoints, and Receptor Organisms
Martin Aaron Site, Camden, NJ

Assessment Endpoint	Measurement Endpoint	Receptor
Survival, growth, and reproduction of terrestrial plant and soil invertebrate communities	Comparison of maximum chemical concentrations in surface soil with soil screening values for terrestrial plants or soil invertebrates. ^a	Terrestrial plants and soil invertebrates (earthworms)
Survival, growth, and reproduction of avian omnivore populations	Comparison of literature-derived chronic No Observed Adverse Effect Level (NOAEL) values for survival, growth, and/or reproductive effects with modeled dietary exposure doses based on maximum surface soil concentrations.	American robin
Survival, growth, and reproduction of mammalian omnivore populations	Comparison of literature-derived chronic No Observed Adverse Effect Level (NOAEL) values for survival, growth, and/or reproductive effects with modeled dietary exposure doses based on maximum surface soil concentrations.	White-footed mouse
Survival, growth, and reproduction of aquatic communities	Comparison of maximum chemical concentrations in groundwater with surface water screening values. ^b	Aquatic life

Notes:

^aThe lower of the screening values for terrestrial plants and soil invertebrates were used for comparison to maximum detected chemical concentrations.

^bThe potential for adverse effects to aquatic life will be initially screened by comparing chemical concentrations in groundwater to surface water screening values.

TABLE 3
Medium-Specific Screening Value Sources
Martin Aaron Site, Camden, NJ

Screening Value (SV) Source	Source Priority Rank by Medium		Weblink
	Soil	Surface Water ^a	
NJDEP ^b	NA	1	www.state.nj.us/dep/landuse/njac/njac.html www.state.nj.us/dep/srp/regs/sediment/index.html#toc
Federal EPA ^c	NA	2	www.epa.gov/waterscience/criteria/aqlife.html
US DOE ^d	1	3	www.esd.ornl.gov/programs/ecorisk/ecorisk.html
SQuiRTs ^e	2	4	www.response.restoration.noaa.gov/cpr/sediment/squirt/squirt.html
Regional EPA ^f	3	5	not available electronically

^aSurface water screening values were used to evaluate chemical concentrations in groundwater.

^bNew Jersey Department of Environmental Protection (NJDEP), Surface Water Quality Standards, N.J.A.C. 7:9B, April 1998; for FW2 waters.

^cUS Environmental Protection Agency (USEPA), National Recommended Water Quality Criteria: 2002, November, EPA 822-R-02-047.

^dUS Department of Energy (US DOE), Preliminary Remediation Goals (PRGs) for Ecological Endpoints, Document ES/ER/TM-162/R2, August 1997.

^eNational Oceanic and Atmospheric Administration (NOAA), Screening Quick Reference Tables (SQuiRTs), (Buchman, 1999).

^fUS Environmental Protection Agency (USEPA), Region III BTAG Screening Levels, 1995.

TABLE 4
Ecological Risk Screening Criteria for Soil
Martin Aaron Site, Camden, NJ

Chemical	Surface Soil	Source
Volatiles (ug/kg)		
Acetone	NSV	-
Benzene	8	b
Bromochloromethane	3000000	c
Bromodichloromethane	450000	c
Bromoform	NSV	-
Bromomethane	NSV	-
2-Butanone	NSV	-
Carbon Disulfide	NSV	-
Carbon Tetrachloride	300	c
Chlorobenzene	40000	a
Chloroethane	NSV	-
Chloroform	100	b
Chloromethane	NSV	-
Cyclohexane	NSV	-
Dibromochloromethane	NSV	-
1,2-Dibromo-3-chloropropane	NSV	-
1,2-Dibromoethane	5000	c
1,2-Dichlorobenzene	100	b
1,3-Dichlorobenzene	NSV	-
1,4-Dichlorobenzene	20000	a
Dichlorodifluoromethane	NSV	-
1,1-Dichloroethane	300	c
1,2-Dichloroethane	100	b
1,1-Dichloroethene	NSV	-
cis-1,2-Dichloroethene	300	c
trans-1,2-Dichloroethene	300	c
1,2-Dichloropropane	100	b
cis-1,3-Dichloropropene	300	c
trans-1,3-Dichloropropene	300	c
Ethylbenzene	10000	b
2-Hexanone	NSV	-
Isopropylbenzene	NSV	-
Methyl Acetate	NSV	-
Methylcyclohexane	NSV	-
Methylene Chloride	100	b
Methyl tert-Butyl Ether	NSV	-
4-Methyl-2-pentanone	100000	c
Styrene	300000	a
1,2,4,5-Tetrachlorobenzene	100	c
1,1,2,2-Tetrachloroethane	100	b
Tetrachloroethene	300	c
Toluene	200000	a
1,2,3-Trichlorobenzene	20000	a
1,2,4-Trichlorobenzene	20000	a
1,1,1-Trichloroethane	100	b
1,1,2-Trichloroethane	100	b
1,1,2-Trichloro-1,2,2-trifluoroethane	NSV	-
Trichloroethene	300	c
Trichlorofluoromethane	NSV	-
Xylenes	100	b
Vinyl Chloride	300	c

TABLE 4
Ecological Risk Screening Criteria for Soil
Martin Aaron Site, Camden, NJ

Chemical	Surface Soil	Source
Semivolatiles (ug/kg)		
Acenaphthene	20000	a
Acenaphthylene	100	c
Acetophenone	NSV	--
Anthracene	100	c
Atrazine	NSV	--
Benzaldehyde	NSV	--
Benzo(a)anthracene	100	b
Benzo(a)pyrene	100	b
Benzo(b)fluoranthene	100	b
Benzo(g,h,i)perylene	100	c
Benzo(k)fluoranthene	100	b
bis(2-Chloroethoxy)methane	NSV	--
bis(2-Chloroethyl)ether	NSV	--
bis(2-Ethylhexyl)phthalate	NSV	--
1,1'-Biphenyl	60000	a
4-Bromophenyl-phenylether	NSV	--
Butylbenzylphthalate	NSV	--
Caprolactam	NSV	--
Carbazole	NSV	--
4-Chloroaniline	NSV	--
4-Chloro-3-methylphenol	NSV	--
2-Choronaphthalene	NSV	--
2-Chlorophenol	100	c
4-Chlorophenyl-phenyl-ether	NSV	--
Chrysene	100	c
Dibenzo(a,h)anthracene	100	b
Dibenzofuran	NSV	--
3,3'-Dichlorobenzidine	NSV	--
2,4-Dichlorophenol	50	b
Diethylphthalate	100000	a
2,4-Dimethylphenol	100	b
Dimethylphthalate	200000	a
Di-n-butylphthalate	200000	a
Di-n-octylphthalate	NSV	--
2,4-Dinitrophenol	20000	a
2,4-Dinitrotoluene	NSV	--
2,6-Dinitrotoluene	NSV	--
4,6-Dinitro-2-methylphenol	NSV	--
Fluoranthene	100	c
Fluorene	100	c
Hexachlorobenzene	50	b
Hexachlorobutadiene	NSV	--
Hexachlorocyclopentadiene	10000	a
Hexachloroethane	NSV	--
Indeno(1,2,3-cd)pyrene	100	b
Isophorone	NSV	--
2-Methylnaphthalene	NSV	--
2-Methylphenol	100	b
3-Methylphenol	NSV	--
4-Methylphenol	100	b
Naphthalene	100	b

TABLE 4
Ecological Risk Screening Criteria for Soil
Martin Aaron Site, Camden, NJ

Chemical	Surface Soil	Source
2-Nitroaniline	NSV	--
3-Nitroaniline	NSV	--
4-Nitroaniline	NSV	--
Nitrobenzene	NSV	--
N-Nitroso-di-n-propylamine	NSV	--
N-Nitrosodiphenylamine	20000	a
4-Nitrophenol	7000	a
2,2'-Oxybis(1-Chloropropane)	NSV	--
Pentachlorophenol	3000	a
Phenanthrene	100	b
Phenol	30000	a
Pyrene	100	b
Pyridine	NSV	--
2,4,5-Trichlorophenol	9000	a
2,4,6-Trichlorophenol	4000	a
Pesticide/Polychlorinated Biphenyls (ug/kg)		
4,4'-DDD	100	c
4,4'-DDE	100	c
4,4'-DDT	100	c
Aldrin	100	c
Aroclor-1016	371	a
Aroclor-1221	371	a
Aroclor-1232	371	a
Aroclor-1242	371	a
Aroclor-1248	371	a
Aroclor-1254	371	a
Aroclor-1260	371	a
Chlordane	100	c
Dieldrin	100	c
Endosulfan I	NSV	--
Endosulfan II	NSV	--
Endosulfan sulfate	NSV	--
Endrin	100	c
Endrin aldehyde	100	c
Endrin ketone	100	c
Heptachlor	NSV	--
Heptachlor epoxide	100	c
Methoxychlor	100	c
Toxaphene	NSV	--
Triphenylene	NSV	--
alpha-BHC	100000	c
alpha-Chlordane	100	c
beta-BHC	100000	c
delta-BHC	100000	c
gamma-BHC (Lindane)	100	a
gamma-Chlordane	NSV	--
Inorganics (mg/kg)		
Aluminum	47000	b
Antimony	5	a
Arsenic	10	c
Barium	283	a
Beryllium	10	a

TABLE 4
Ecological Risk Screening Criteria for Soil
Martin Aaron Site, Camden, NJ

Chemical	Surface Soil	Source
Cadmium	4	a
Calcium	NSV	-
Chromium	0.40	a
Cobalt	20	a
Copper	60	c
Iron	18000	b
Lead	41	a
Magnesium	4400	c
Manganese	330	b
Mercury	0.058	b
Nickel	30	a
Potassium	NSV	-
Selenium	0.21	a
Silver	2	a
Sodium	NSV	-
Thallium	1	a
Vanadium	2	a
Zinc	9	a

Notes:

NSV - no screening value

Source Codes:

a - US Department of Energy Preliminary Remediation Goals (USDOE, 1997)

b - NOAA Screening Quick Reference Tables (SQuiRTs), (Buchman, 1999)

c - USEPA Region III Screening Levels (USEPA, 1995)

TABLE 5
Ecological Risk Screening Criteria for Water
Martin Aaron Site, Camden, NJ

Chemical	Surface Water (ug/L)	Source
Volatiles		
1,1,1-Trichloroethane	11	c
1,1,2,2-Tetrachloroethane	610	c
1,1,2-Trichloro-1,2,2-trifluoroethane	NSV	--
1,1,2-Trichloroethane	1200	c
1,1-Dichloroethane	47	c
1,1-Dichloroethene	25	c
1,2,3-Trichlorobenzene	50	d
1,2,4,5-Tetrachlorobenzene	50	e
1,2,4-Trichlorobenzene	110	c
1,2-Dibromo-3-chloropropane	NSV	--
1,2-Dibromoethane	18000	e
1,2-Dichlorobenzene	14	c
1,2-Dichloroethane	20000	d
1,2-Dichloropropane	5700	e
1,3-Dichlorobenzene	71	c
1,4-Dichlorobenzene	15	c
2-Butanone	14000	c
2-Hexanone	99	c
4-Methyl-2-pentanone	170	c
Acetone	1500	c
Benzene	130	c
Bromochloromethane	11000	e
Bromodichloromethane	11000	e
Bromoform	NSV	--
Bromomethane	NSV	--
Carbon Disulfide	0.92	c
Carbon Tetrachloride	9.8	c
Chlorobenzene	64	c
Chloroethane	NSV	--
Chloroform	28	c
Chloromethane	NSV	--
cis-1,2-Dichloroethene	116000	e
cis-1,3-Dichloropropene	244	e
Cyclohexane	NSV	--
Dibromochloromethane	11000	e
Dichlorodifluoromethane	11000	e
Ethylbenzene	7.3	c
Isopropylbenzene	NSV	--
Methyl Acetate	NSV	--
Methyl tert-Butyl Ether	NSV	--
Methylcyclohexane	NSV	--
Methylene Chloride	2200	c
Styrene	NSV	--
Tetrachloroethene	98	c
Toluene	9.8	c
trans-1,2-Dichloroethene	11600	e
trans-1,3-Dichloropropene	244	e
Trichloroethene	470.00	c
Trichlorofluoromethane	11000	e
Vinyl Chloride	782	c
Xylenes (total)	13	c
Semivolatiles		

TABLE 5
Ecological Risk Screening Criteria for Water
Martin Aaron Site, Camden, NJ

Chemical	Surface Water (ug/L)	Source
1,1'-Biphenyl	NSV	--
2,2'-oxybis(1-Chloropropane)	NSV	--
2,4,5-Trichlorophenol	63	d
2,4,6-Trichlorophenol	970	d
2,4-Dichlorophenol	365	d
2,4-Dimethylphenol	2,120	e
2,4-Dinitrophenol	150	d
2,4-Dinitrotoluene	230	d
2,6-Dinitrotoluene	NSV	--
2-Chloronaphthalene	620	e
2-Chlorophenol	970	e
2-Methylnaphthalene	NSV	--
2-Methylphenol	13	c
2-Nitroaniline	NSV	--
2-Nitrophenol	300	c
3,3'-Dichlorobenzidine	NSV	--
3-Methylphenol	NSV	--
3-Nitroaniline	NSV	--
4,6-Dinitro-2-methylphenol	NSV	--
4-Bromophenyl-phenylether	NSV	--
4-Chloro-3-methylphenol	NSV	--
4-Chloroaniline	50	d
4-Chlorophenyl-phenyl ether	NSV	--
4-Methylphenol	NSV	--
4-Nitroaniline	NSV	--
4-Nitrophenol	150	e
Acenaphthene	23	c
Acenaphthylene	NSV	--
Acetophenone	NSV	--
Anthracene	0.1	e
Atrazine	NSV	--
Benzaldehyde	NSV	--
Benzo(a)anthracene	0.027	c
Benzo(a)pyrene	0.014	c
Benzo(b)fluoranthene	NSV	--
Benzo(g,h,i)perylene	NSV	--
Benzo(k)fluoranthene	NSV	--
bis(2-Chloroethoxy)methane	11000	e
bis-(2-Chloroethyl) ether	NSV	--
bis(2-Ethylhexyl)phthalate	0.12	c
Butylbenzylphthalate	3	d
Caprolactam	NSV	--
Chrysene	NSV	--
Dibenzo(a,h)anthracene	NSV	--
Dibenzofuran	3.7	c
Diethylphthalate	210	c
Dimethylphthalate	3	d
Di-n-butylphthalate	1	c
Di-n-octylphthalate	3	d
Fluoranthene	6.2	c
Fluorene	3.9	c
Hexachlorobenzene	3.68	d
Hexachlorobutadiene	9.3	e

TABLE 5
Ecological Risk Screening Criteria for Water
Martin Aaron Site, Camden, NJ

Chemical	Surface Water (ug/L)	Source
Hexachlorocyclopentadiene	5.2	d
Hexachloroethane	540	d
Indeno(1,2,3-cd)pyrene	NSV	--
Isophorone	117000	e
Naphthalene	12	c
Nitrobenzene	27000	e
N-Nitroso-di-n-propylamine	NSV	--
N-Nitrosodiphenylamine	210	c
Pentachlorophenol ³	15	a
Phenanthrene	6.3	c
Phenol	110	c
Pyrene	NSV	--
Pyridine	NSV	--
Pesticide/Polychlorinated Biphenyls		
2,4-D (Dichlorophenoxyacetic Acid)	NSV	--
4,4'-DDD	0.6	e
4,4'-DDE	1050	e
4,4'-DDT	0.001	a
Aldrin	3	e
Alpha-BHC	100	e
Alpha-Chlordane	0.0043	e
Aroclor-1016	0.000244	a
Aroclor-1221	0.000244	a
Aroclor-1232	0.000244	a
Aroclor-1242	0.000244	a
Aroclor-1248	0.000244	a
Aroclor-1254	0.000244	a
Aroclor-1260	0.000244	a
Chlordane	0.0043	a
Delta-BHC	100	e
Dieldrin	0.0019	a
Endosulfan I (alpha endosulfan)	0.056	b
Endosulfan II (beta endosulfan)	0.056	b
Endosulfan Sulfate	0.056	e
Endrin	0.0023	a
Endrin Aldehyde	0.0023	e
Endrin Ketone	0.0023	e
Gamma-BHC (Lindane)	0.08	a
Gamma-Chlordane	0.0043	e
Heptachlor	0.0038	a
Heptachlor Epoxide	0.0038	a
Methoxychlor	0.03	a
Toxaphene	0.0002	a
Triphenylene	NSV	--
Inorganics		
Aluminum ¹	87	b
Antimony	30	c
Arsenic	150	b
Arsenic III	190	c
Arsenic V	3.1	c
Barium	4	c
Beryllium	0.66	c
Cadmium ²	2.2	b

TABLE 5
Ecological Risk Screening Criteria for Water
Martin Aaron Site, Camden, NJ

Chemical	Surface Water (ug/L)	Source
Chromium III ²	74	b
Chromium VI ²	11	b
Cobalt	23	c
Copper ²	9	b
Cyanide	5.2	a
Iron ¹	1000	b
Lead ²	2.5	b
Manganese	120	c
Mercury	0.77	b
Molybdenum	370	c
Nickel ²	52	b
Selenium	5	b
Silver	0.36	c
Thallium	40	e
Tin	73	c
Titanium	NSV	--
Vanadium	20	c
Zinc ²	120	b

Notes:

NSV - no screening value

¹Non priority pollutant, NAWQC (USEPA, 2002)

²Hardness dependent; adjusted to a default value of 100 mg/L

³pH dependent via $e^{(1.005(\text{pH}) - 5.290)}$; value based on a pH of 7.8

Source Codes:

a - New Jersey Water Quality Criteria (NJDEP, 1998)

b - USEPA National Ambient Water Quality Criteria (USEPA, 2002)

c - US Department of Energy Preliminary Remediation Goals (PRGs) (USDOE, 1997)

d - NOAA Screening Quick Reference Tables (SQuiRTs), (Buckman, 1999)

e - USEPA Region III Screening Levels (USEPA, 1995)

TABLE 6
Ingestion Screening Values for Mammals
Martin Aaron Site, Camden, NJ

Chemical	Test Organism	Body Weight (kg)	Duration	Exposure Route	Effect/Endpoint	NOAEL (mg/kg/d)	Reference
Inorganics							
Antimony	mouse	0.03	lifetime	oral in water	lifespan/longevity	0.125	Sample et al. 1996
Arsenic	mouse	0.03	3 generations	oral in water	reproduction	0.126	Sample et al. 1996
Barium	rat	0.435	16 months	oral in water	growth/hypertension	5.1	Sample et al. 1996
Cadmium	rat	0.303	6 weeks	oral (gavage)	reproduction	1	Sample et al. 1996
Chromium	rat	0.35	3 months	oral in water	mortality	13.14	Sample et al. 1996
Cobalt	rat	0.35	69 days	oral in diet	reproduction	5	ATSDR 1992
Copper	mink	1	357 days	oral in diet	reproduction	11.7	Sample et al. 1996
Iron	rabbit	3.8	unknown	oral in diet	tolerance level	50	NAS 1980
Lead	rat	0.35	3 generations	oral in diet	reproduction	8	Sample et al. 1996
Manganese	rat	0.35	224 days	oral in diet	reproduction	88	Sample et al. 1996
Mercury	rat	0.35	3 generations	oral in diet	reproduction	0.032	Sample et al. 1996
Nickel	rat	0.35	3 generations	oral in diet	reproduction	40	Sample et al. 1996
Selenium	rat	0.35	1 year	oral in water	reproduction	0.2	Sample et al. 1996
Silver	rat	0.35	2 weeks	oral in water	mortality	18.1	ATSDR 1990
Thallium	rat	0.365	60 days	oral in water	reproduction	0.074	Sample et al. 1996
Vanadium	rat	0.26	60 days +	oral intubation	reproduction	0.21	Sample et al. 1996
Zinc	rat	0.35	GD 1-16	oral in diet	reproduction	160	Sample et al. 1996
Pesticides/PCBs							
4,4'-DDE	rat	0.35	2 years	oral in diet	reproduction	0.8	Sample et al. 1996
4,4'-DDT	rat	0.35	2 years	oral in diet	reproduction	0.8	Sample et al. 1996
Aldrin	rat	0.35	3 generations	oral in diet	reproduction	0.2	Sample et al. 1996
alpha-Chlordane	mouse	0.03	6 generations	oral in diet	reproduction	4.58	Sample et al. 1996
Aroclor-1016	mink	1	18 months	oral in diet	reproduction	1.37	Sample et al. 1996
Aroclor-1221	mink	1	7 months	oral in diet	reproduction	0.069	Sample et al. 1996
Aroclor-1232	mink	1	7 months	oral in diet	reproduction	0.069	Sample et al. 1996
Aroclor-1242	mink	1	7 months	oral in diet	reproduction	0.069	Sample et al. 1996
Aroclor-1248	mouse	0.03	5 weeks	oral in diet	immunological	1.3	ATSDR 1995b
Aroclor-1254	oldfield mouse	0.014	12 months	oral in diet	reproduction	0.068	Sample et al. 1996
Aroclor-1260	oldfield mouse	0.014	12 months	oral in diet	reproduction	0.068	Sample et al. 1996
Dieldrin	rat	0.35	3 generations	oral in diet	reproduction	0.02	Sample et al. 1996
Endosulfan I	rat	0.35	30 days	oral (intubation)	reproduction	1.5	Sample et al. 1996
Endosulfan II	rat	0.35	30 days	oral (intubation)	reproduction	1.5	Sample et al. 1996
Endosulfan Sulfate	rat	0.35	30 days	oral (intubation)	reproduction	1.5	Sample et al. 1996

TABLE 6
Ingestion Screening Values for Mammals
Martin Aaron Site, Camden, NJ

Chemical	Test Organism	Body Weight (kg)	Duration	Exposure Route	Effect/Endpoint	NOAEL (mg/kg/d)	Reference
Endrin	mouse	0.03	120 days	oral in diet	reproduction	0.092	Sample et al. 1996
Endrin Ketone	mouse	0.03	120 days	oral in diet	reproduction	0.092	Sample et al. 1996
Gamma-Chlordane	mouse	0.03	6 generations	oral in diet	reproduction	4.58	Sample et al. 1996
Heptachlor	mink	1	181 days	oral in diet	reproduction	0.1	Sample et al. 1996
Methoxychlor	rat	0.35	11 months	oral in diet	reproduction	4	Sample et al. 1996
Toxaphene	rat	0.35	3 generations	oral in diet	reproduction	8	Sample et al. 1996
Semivolatile Organic Compounds							
1,2-Dichlorobenzene	rat	0.35	chronic	oral (gavage)	liver/kidney	85.7	Coulston and Kolbye 1994
1,3-Dichlorobenzene	rat	0.35	chronic	oral (gavage)	liver/kidney	85.7	Coulston and Kolbye 1994
2,4,5-Trichlorophenol	rat	0.35	98 days	oral in diet	hepatic/renal	80	McCollister et al. 1961
2,4,6-Trichlorophenol	rat	0.35	98 days	oral in diet	hepatic/renal	80	McCollister et al. 1961
2,4-Dichlorophenol	rat	0.35	103 weeks	oral in diet	reproduction	440	NTP 1989
2,4-Dimethylphenol	--	--	--	--	--	NA	--
2,4-Dinitrophenol	--	--	--	--	--	NA	--
2,4-Dinitrotoluene	--	--	--	--	--	NA	--
2,6-Dinitrotoluene	--	--	--	--	--	NA	--
2-Chloronaphthalene	--	--	--	--	--	NA	--
2-Chlorophenol	--	--	--	--	--	NA	--
2-Methylnaphthalene	mouse	0.03	81 weeks	oral in diet	systemic	143.7	ATSDR 1995a
2-Nitroaniline	--	--	--	--	--	NA	--
2-Nitrophenol	--	--	--	--	--	NA	--
3,3'-Dichlorobenzidine	--	--	--	--	--	NA	--
3-Nitroaniline	--	--	--	--	--	NA	--
4-Bromophenyl-Phenylether	--	--	--	--	--	NA	--
4-Chloroaniline	--	--	--	--	--	NA	--
4-Chlorophenyl-Phenylether	--	--	--	--	--	NA	--
4-Nitroaniline	--	--	--	--	--	NA	--
4-Nitrophenol	--	--	--	--	--	NA	--
Acenaphthene	mouse	0.03	13 weeks	oral (gavage)	reproduction	350	ATSDR 1995a
Acenaphthylene	mouse	0.03	13 weeks	oral (gavage)	reproduction	350	ATSDR 1995a
Anthracene	mouse	0.03	13 weeks	oral (gavage)	reproduction	1000	ATSDR 1995a
Benzo(a)anthracene	mouse	0.03	GD 7-16	oral (intubation)	reproduction	1	Sample et al. 1996
Benzo(a)pyrene	mouse	0.03	GD 7-16	oral (intubation)	reproduction	1	Sample et al. 1996
Benzo(b)fluoranthene	mouse	0.03	GD 7-16	oral (intubation)	reproduction	1	Sample et al. 1996

TABLE 6
Ingestion Screening Values for Mammals
Martin Aaron Site, Camden, NJ

Chemical	Test Organism	Body Weight (kg)	Duration	Exposure Route	Effect/Endpoint	NOAEL (mg/kg/d)	Reference
Benzo(g,h,i)perylene	mouse	0.03	19 to 29 days	oral in diet	reproduction	133	ATSDR 1995a
Benzo(k)fluoranthene	mouse	0.03	GD 7-16	oral (intubation)	reproduction	1	Sample et al. 1996
Bis(2-Chloroethoxy)methane	--	--	--	--	--	NA	--
Bis(2-Chloroethyl)ether	--	--	--	--	--	NA	--
Bis(2-Ethylhexyl)phthalate	mouse	0.03	105 days	oral in diet	reproduction	18.3	Sample et al. 1996
Butylbenzylphthalate	rat	0.35	2 years	oral in diet	hepatic	240	NTP 1997
Carbazole	mouse	0.03	19 to 29 days	oral in diet	reproduction	133	ATSDR 1995a
Chrysene	mouse	0.03	GD 7-16	oral (intubation)	reproduction	1	Sample et al. 1996
Dibenz(a,h)anthracene	mouse	0.03	GD 7-16	oral (intubation)	reproduction	1	Sample et al. 1996
Dibenzofuran	mouse	0.03	19 to 29 days	oral in diet	reproduction	133	ATSDR 1995a
Dimethylphthalate	--	--	--	--	--	NA	--
Di-n-octylphthalate	mouse	0.03	105 days	oral in diet	reproduction	55	Sample et al. 1996
Fluoranthene	mouse	0.03	13 weeks	oral (gavage)	hepatic	125	ATSDR 1995a
Fluorene	mouse	0.03	13 weeks	oral (gavage)	hematological	125	ATSDR 1995a
Hexachlorobutadiene	rat	0.35	90 days +	oral	reproduction	2	IPCS 1994
Hexachlorobenzene	rat	0.35	2 years	oral	reproduction	1.6	ATSDR 1989
Hexachlorocyclopentadiene	rat	0.35	GD 6-15	oral	reproduction	10	USEPA 1984
Hexachloroethane	--	--	--	--	--	NA	--
Indeno(1,2,3-cd)pyrene	mouse	0.03	GD 7-16	oral (intubation)	reproduction	1	Sample et al. 1996
Isophorone	--	--	--	--	--	NA	--
Naphthalene	mouse	0.03	13 weeks	oral (gavage)	reproduction	140	ATSDR 1995a
Nitrobenzene	--	--	--	--	--	NA	--
N-Nitroso-di-n-propylamine	--	--	--	--	--	NA	--
N-Nitrosodiphenylamine	rat	0.35	8 to 11 weeks	oral in diet	systemic	150	ATSDR 1993
Pentachlorophenol	rat	0.35	up to 24 months	oral in diet	reproduction	3	Coulston and Kolby 1994
Phenanthrene	mouse	0.03	19 to 29 days	oral in diet	reproduction	133	ATSDR 1995a
Phenol	--	--	--	--	--	NA	--
Pyrene	mouse	0.03	19 to 29 days	oral in diet	reproduction	133	ATSDR 1995a
Volatile Organic Compounds							
1,1,1-Trichloroethane	--	--	--	--	--	NA	--
1,1,2,2-Tetrachloroethane	--	--	--	--	--	NA	--
1,1,2-Trichloroethane	--	--	--	--	--	NA	--
1,1-Dichloroethane	--	--	--	--	--	NA	--
1,1-Dichloroethene	--	--	--	--	--	NA	--

TABLE 6
Ingestion Screening Values for Mammals
Martin Aaron Site, Camden, NJ

Chemical	Test Organism	Body Weight (kg)	Duration	Exposure Route	Effect/Endpoint	NOAEL (mg/kg/d)	Reference
1,2-Dibromo-3-Chloropropane	--	--	--	--	--	NA	--
1,2-Dibromoethane	--	--	--	--	--	NA	--
1,2-Dichloroethane	--	--	--	--	--	NA	--
1,2-Dichloropropane	--	--	--	--	--	NA	--
2-Butanone	--	--	--	--	--	NA	--
2-Hexanone	--	--	--	--	--	NA	--
Acetone	--	--	--	--	--	NA	--
Benzene	--	--	--	--	--	NA	--
Bromoform	--	--	--	--	--	NA	--
Bromomethane	--	--	--	--	--	NA	--
Carbon Disulfide	--	--	--	--	--	NA	--
Carbon Tetrachloride	rat	0.35	2 years	oral in diet	reproduction	16	Sample et al. 1996
Chloroethane	--	--	--	--	--	NA	--
Chloroform	rat	0.35	13 weeks	oral (intubation)	systemic	150	Sample et al. 1996
Chloromethane	--	--	--	--	--	NA	--
Cis-1,2-Dichloroethene	--	--	--	--	--	NA	--
Cis-1,3-Dichloropropene	--	--	--	--	--	NA	--
Dibromochloromethane	--	--	--	--	--	NA	--
Tetrachloroethene	mouse	0.03	6 weeks	oral (gavage)	hepatotoxicity	14	Sample et al. 1996
Trans-1,2-Dichloroethene	--	--	--	--	--	NA	--
Trans-1,3-Dichloropropene	--	--	--	--	--	NA	--
Trichloroethene	rat	0.35	?	oral	reproduction	1000	Coulston and Kölby 1994
Vinyl Chloride	--	--	--	--	--	NA	--
Xylenes (total)	mouse	0.03	GD 6-15	oral (gavage)	reproduction	2.1	Sample et al. 1996

Notes:

NA = not applicable; no ingestion screening value was available

TABLE 7
Ingestion Screening Values for Birds
Martin Aaron Site, Camden, NJ

Chemical	Test Organism	Body Weight (kg)	Duration	Exposure Route	Effect/Endpoint	NOAEL (mg/kg/d)	Reference
Inorganics							
Antimony	northern bobwhite	0.19	6 weeks	oral	unknown	4740	Opresko et al. 1993
Arsenic	brown-headed cowbird	0.049	7 months	oral in diet	mortality	2.46	Sample et al. 1996
Barium	chicks	0.121	4 weeks	oral in diet	mortality	208	Sample et al. 1996
Cadmium	mallard	1.153	90 days	oral in diet	reproduction	1.45	Sample et al. 1996
Chromium	American black duck	1.25	10 months	oral in diet	reproduction	1	Sample et al. 1996
Cobalt	chicken	1.8	14 days	oral in diet	growth	1.47	Diaz et al. 1994
Copper	chicks	0.534	10 weeks	oral in diet	growth/mortality	47	Sample et al. 1996
Iron	chicken	1.6	unknown	oral	maximum tolerance level	100	NAS 1980
Lead	Japanese quail	0.15	12 weeks	oral in diet	reproduction	1.13	Sample et al. 1996
Manganese	Japanese quail	0.072	75 days	oral in diet	growth/behavior	977	Sample et al. 1996
Mercury	Japanese quail	0.15	1 year	oral in diet	reproduction	0.45	Sample et al. 1996
Nickel	mallard	0.782	90 days	oral in diet	growth/mortality	77.4	Sample et al. 1996
Selenium	screech owl	0.2	13.7 weeks	oral in diet	reproduction	0.44	Sample et al. 1996
Silver	mallard	?	14 days	oral	unknown	178	USEPA 1999
Thallium	European starling	?	acute	oral	unknown	0.35	USEPA 1999
Vanadium	mallard	1.17	12 weeks	oral in diet	growth/mortality	11.4	Sample et al. 1996
Zinc	chicken	1.935	44 weeks	oral in diet	reproduction	14.5	Sample et al. 1996
Pesticides/PCBs							
4,4'-DDE	American kestrel	0.115	2 years	oral	reproduction	0.05	McLane and Hall 1972
4,4'-DDT	American kestrel	0.115	2 years	oral	reproduction	0.05	McLane and Hall 1972
Aldrin	mallard	1.134	chronic	oral	mortality	0.5	Tucker and Crabtree 1970
alpha-Chlordane	red-winged blackbird	0.064	84 days	oral in diet	mortality	2.14	Sample et al. 1996
Aroclor-1016	screech owl	0.181	2 generations	oral in diet	reproduction	0.41	Sample et al. 1996
Aroclor-1221	screech owl	0.181	2 generations	oral in diet	reproduction	0.41	Sample et al. 1996
Aroclor-1232	screech owl	0.181	2 generations	oral in diet	reproduction	0.41	Sample et al. 1996
Aroclor-1242	screech owl	0.181	2 generations	oral in diet	reproduction	0.41	Sample et al. 1996
Aroclor-1248	ring-necked pheasant	1	17 weeks	oral	reproduction	0.18	Sample et al. 1996
Aroclor-1254	ring-necked pheasant	1	17 weeks	oral	reproduction	0.18	Sample et al. 1996
Aroclor-1260	ring-necked pheasant	1	17 weeks	oral	reproduction	0.18	Sample et al. 1996
Dieldrin	barn owl	0.466	2 years	oral in diet	reproduction	0.077	Sample et al. 1996
Endosulfan I	gray partridge	0.4	4 weeks	oral in diet	reproduction	10	Sample et al. 1996
Endosulfan II	gray partridge	0.4	4 weeks	oral in diet	reproduction	10	Sample et al. 1996
Endosulfan Sulfate	gray partridge	0.4	4 weeks	oral in diet	reproduction	10	Sample et al. 1996
Endrin	screech owl	0.181	>83 days	oral in diet	reproduction	0.01	Sample et al. 1996

TABLE 7
Ingestion Screening Values for Birds
Martin Aaron Site, Camden, NJ

Chemical	Test Organism	Body Weight (kg)	Duration	Exposure Route	Effect/Endpoint	NOAEL (mg/kg/d)	Reference
Endrin Ketone	screech owl	0.181	>83 days	oral in diet	reproduction	0.01	Sample et al. 1996
Gamma-Chlordane	red-winged blackbird	0.064	84 days	oral in diet	mortality	2.14	Sample et al. 1996
Heptachlor	quail	0.191	5 days	oral in diet	mortality	0.405	Hill et al. 1975
Methoxychlor	quail	0.191	5 days	oral in diet	mortality	405	Hill and Camardese 1986
Toxaphene	mallard	1.043	5 days	oral in diet	mortality	0.307	Hill and Camardese 1986
Semivolatile Organic Compounds							
1,2-Dichlorobenzene	northern bobwhite	0.157	14 days	oral (gavage)	growth/mortality	250	Grimes and Jaber 1989
1,3-Dichlorobenzene	northern bobwhite	0.157	14 days	oral (gavage)	growth/mortality	250	Grimes and Jaber 1989
2,4,5-Trichlorophenol	--	--	--	--	--	NA	--
2,4,6-Trichlorophenol	--	--	--	--	--	NA	--
2,4-Dichlorophenol	--	--	--	--	--	NA	--
2,4-Dimethylphenol	--	--	--	--	--	NA	--
2,4-Dinitrophenol	--	--	--	--	--	NA	--
2,4-Dinitrotoluene	--	--	--	--	--	NA	--
2,6-Dinitrotoluene	--	--	--	--	--	NA	--
2-Chloronaphthalene	--	--	--	--	--	NA	--
2-Chlorophenol	--	--	--	--	--	NA	--
2-Methylnaphthalene	--	--	--	--	--	NA	--
2-Nitroaniline	--	--	--	--	--	NA	--
2-Nitrophenol	--	--	--	--	--	NA	--
3,3'-Dichlorobenzidine	--	--	--	--	--	NA	--
3-Nitroaniline	--	--	--	--	--	NA	--
4-Bromophenyl-Phenylether	--	--	--	--	--	NA	--
4-Chloroaniline	--	--	--	--	--	NA	--
4-Chlorophenyl-Phenylether	--	--	--	--	--	NA	--
4-Nitroaniline	--	--	--	--	--	NA	--
4-Nitrophenol	--	--	--	--	--	NA	--
Acenaphthene	chicken	1.5	34 days	oral in diet	reproduction	39.5	Rigdon and Neal 1963
Acenaphthylene	chicken	1.5	34 days	oral in diet	reproduction	39.5	Rigdon and Neal 1963
Anthracene	mallard	1.043	7 months	oral in diet	hepatic	22.8	Patton and Dieter 1980
Benzo(a)anthracene	chicken	1.5	34 days	oral in diet	reproduction	39.5	Rigdon and Neal 1963
Benzo(a)pyrene	chicken	1.5	34 days	oral in diet	reproduction	39.5	Rigdon and Neal 1963
Benzo(b)fluoranthene	chicken	1.5	34 days	oral in diet	reproduction	39.5	Rigdon and Neal 1963
Benzo(g,h,i)perylene	chicken	1.5	34 days	oral in diet	reproduction	39.5	Rigdon and Neal 1963
Benzo(k)fluoranthene	chicken	1.5	34 days	oral in diet	reproduction	39.5	Rigdon and Neal 1963

TABLE 7
Ingestion Screening Values for Birds
Martin Aaron Site, Camden, NJ

Chemical	Test Organism	Body Weight (kg)	Duration	Exposure Route	Effect/Endpoint	NOAEL (mg/kg/d)	Reference
Bis(2-Chloroethoxy)methane	--	--	--	--	--	NA	--
Bis(2-Chloroethyl)ether	--	--	--	--	--	NA	--
Bis(2-Ethylhexyl)phthalate	ringed dove	0.155	4 weeks	oral in diet	reproduction	1.1	Sample et al. 1996
Butylbenzylphthalate	--	--	--	--	--	NA	--
Carbazole	--	--	--	--	--	NA	--
Chrysene	chicken	1.5	34 days	oral in diet	reproduction	39.5	Rigdon and Neal 1963
Dibenz(a,h)anthracene	chicken	1.5	34 days	oral in diet	reproduction	39.5	Rigdon and Neal 1963
Dibenzofuran	--	--	--	--	--	NA	--
Dimethylphthalate	--	--	--	--	--	NA	--
Di-n-octylphthalate	ring-necked pheasant	1	?	?	mortality	50	TERRETOX 1998
Fluoranthene	chicken	1.5	34 days	oral in diet	reproduction	39.5	Rigdon and Neal 1963
Fluorene	chicken	1.5	34 days	oral in diet	reproduction	39.5	Rigdon and Neal 1963
Hexachlorobutadiene	Japanese quail	0.19	90 days	oral	reproduction	2.5	Coulston and Kolbye 1994; IPCS 1994
Hexachlorobenzene	Japanese quail	0.19	?	oral	reproduction	0.08	Coulston and Kolbye 1994
Hexachlorocyclopentadiene	--	--	--	--	--	NA	--
Hexachloroethane	--	--	--	--	--	NA	--
Indeno(1,2,3-cd)pyrene	chicken	1.5	34 days	oral in diet	reproduction	39.5	Rigdon and Neal 1963
Isophorone	--	--	--	--	--	NA	--
Naphthalene	mallard	1.04	7 months	oral in diet	hepatic	22.8	Patton and Dieter 1980
Nitrobenzene	--	--	--	--	--	NA	--
N-Nitroso-di-n-propylamine	--	--	--	--	--	NA	--
N-Nitrosodiphenylamine	--	--	--	--	--	NA	--
Pentachlorophenol	chicken	1.5	8 weeks	oral	growth	100	Eisler 1989
Phenanthren	chicken	1.5	34 days	oral in diet	reproduction	39.5	Rigdon and Neal 1963
Phenol	--	--	--	--	--	NA	--
Pyrene	chicken	1.5	34 days	oral in diet	reproduction	39.5	Rigdon and Neal 1963
Volatile Organic Compounds							
1,1,1-Trichloroethane	--	--	--	--	--	NA	--
1,1,2,2-Tetrachloroethane	--	--	--	--	--	NA	--
1,1,2-Trichloroethane	--	--	--	--	--	NA	--
1,1-Dichloroethane	--	--	--	--	--	NA	--
1,1-Dichloroethene	--	--	--	--	--	NA	--
1,2-Dibromo-3-Chloropropane	--	--	--	--	--	NA	--
1,2-Dibromoethane	--	--	--	--	--	NA	--

TABLE 7
Ingestion Screening Values for Birds
Martin Aaron Site, Camden, NJ

Chemical	Test Organism	Body Weight (kg)	Duration	Exposure Route	Effect/Endpoint	NOAEL (mg/kg/d)	Reference
1,2-Dichloroethane	--	--	--	--	--	NA	--
1,2-Dichloropropane	--	--	--	--	--	NA	--
2-Butanone	--	--	--	--	--	NA	--
2-Hexanone	--	--	--	--	--	NA	--
Acetone	--	--	--	--	--	NA	--
Benzene	--	--	--	--	--	NA	--
Bromoform	--	--	--	--	--	NA	--
Bromomethane	--	--	--	--	--	NA	--
Carbon Disulfide	--	--	--	--	--	NA	--
Carbon Tetrachloride	--	--	--	--	--	NA	--
Chloroethane	--	--	--	--	--	NA	--
Chloroform	--	--	--	--	--	NA	--
Chloromethane	--	--	--	--	--	NA	--
Cis-1,2-Dichloroethene	--	--	--	--	--	NA	--
Cis-1,3-Dichloropropene	--	--	--	--	--	NA	--
Dibromochloromethane	--	--	--	--	--	NA	--
Tetrachloroethene	--	--	--	--	--	NA	--
Trans-1,2-Dichloroethene	--	--	--	--	--	NA	--
Trans-1,3-Dichloropropene	--	--	--	--	--	NA	--
Trichloroethene	--	--	--	--	--	NA	--
Vinyl Chloride	--	--	--	--	--	NA	--
Xylenes (total)	quail	0.191	subacute	unknown	"toxicity"	40.5	Hill and Camardese 1986

Notes:

NA = not applicable; no ingestion screening value was available

TABLE 8 Sample Groupings Martin Aaron Site, Camden, NJ							
Surface Soil				Ground Water			
South Jersey Port Property		Martin Aaron Site,		Round 1		Round 2	
Location	Sample ID	Location	Sample ID	Location	Sample ID	Location	Sample ID
MA-SB-29	MA-SB29-SS-1.0	MA-SB-02	MA-SB02-SS	MA-MW-01S	MA-MW-1S-R1	MA-MW-01S	MA-MW-1S-R2
MA-SB-62	MA-SB62-SS-1	MA-SB-04	MA-SB04-SS	MA-MW-04S	MA-MW-4S-R1	MA-MW-04S	MA-MW-4S-R2
MA-SB-66	MA-SB66-SS-0.5	MA-SB-06	MA-SB06-SS	MA-MW-05S	MA-MW-5S-R1	MA-MW-05S	MA-MW-5S-R2
MA-SB-67	MA-SB67-SS-1.0	MA-SB-08	MA-SB08-SS	MA-MW-08S	MA-MW-8S-R1	MA-MW-08S	MA-MW-8S-R2
MA-SB-68	MA-SB68-SS-1.0	MA-SB-09	MA-SB09-SS	MA-MW-09S	MA-MW-9S-R1	MA-MW-09S	MA-MW-9S-R2
MA-SB-69	MA-SB69-SS-1.0	MA-SB-11	MA-SB11-SS	MA-MW-10S	MA-MW-10S-R1	MA-MW-10S	MA-MW-10S-R2
MA-SB-72	MA-SB72-SS-0.5	MA-SB-112	MA-SB112-SS	MA-MW-11S	MA-MW-11S-R1	MA-MW-11S	MA-MW-11S-R2
MA-SB-75	MA-SB75-SS-1.0	MA-SB-120	MA-SB120-SS	MA-MW-12S	MA-MW-12S-R1	MA-MW-12S	MA-MW-12S-R2
MA-SB-77	MA-SB77-SS-1.0	MA-SB-122	MA-SB122-SS	MA-MW-13S	MA-MW-13S-R1	MA-MW-13S	MA-MW-13S-R2
MA-SB-78	MA-SB78-SS-0.5	MA-SB-124	MA-SB124-SS	MA-MW-14S	MA-MW-14S-R1	MA-MW-14S	MA-MW-14S-R2
MA-SB-79	MA-SB79-SS-0.5	MA-SB-130	MA-SB130-SS	MA-MW-15S	MA-MW-15S-R1	MA-MW-15S	MA-MW-15S-R2
MA-SO-301	MA-SO301-SS-1.0	MA-SB-131	MA-SB131-SS	MA-MW-16S	MA-MW-16S-R1	MA-MW-16S	MA-MW-16S-R2
MA-SO-302	MA-SO302-SS-1.0	MA-SB-14	MA-SB14-SS	MA-MW-17S	MA-MW-17S-R1	MA-MW-17S	MA-MW-17S-R2
MA-SO-303	MA-SO303-SS-1.0	MA-SB-31	MA-SB31-SS	MA-MW-18S	MA-MW-18S-R1	MA-MW-18S	MA-MW-18S-R2
		MA-SB-42	MA-SB42-SS	MA-MW-19S	MA-MW-19S-R1	MA-MW-19S	MA-MW-19S-R2
		MA-SB-56	MA-SB56-SS	MA-MW-20S	MA-MW-20S-R1	MA-MW-20S	MA-MW-20S-R2
		MA-SB-60	MA-SB60-SS	MA-MW-21S	MA-MW-21S-R1	MA-MW-21S	MA-MW-21S-R2
		MA-SB-81	MA-SB81-SS	MA-MW-22S	MA-MW-22S-R1	MA-MW-22S	MA-MW-22S-R2
		MA-SB-82	MA-SB82-SS				
		MA-SB-96	MA-SB96-SS				
		MA-SB-97	MA-SB97-SS				
		MA-SB-98	MA-SB98-SS				
		MA-SO-201	MA-SO201-SS				
		MA-SO-204	MA-SO204-SS-0.5				
		MA-SO-211	MA-SO211-SS-1.0				
		MA-SO-212	MA-SO212-SS-1.0				
		MA-SO-214	MA-SO214-SS				

TABLE 9
Summary Statistics for Surface Soil (0 to 2 feet) - Martin Aaron, Inc.
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No	Frequency of	Frequency of	Minimum	Maximum	Mean	
			Detection	Rejected*	Value	Value	Max SampleID	Value
SVOCs (ug/kg)	Acenaphthene	83-32-9	15 / 27	0 / 27	13 J	17000 J	MA-SB02-SS	1804.889
	Acenaphthylene	208-96-8	15 / 27	0 / 27	13 J	2200 J	MA-SB112-SS	698.963
	Acetophenone	98-86-2	4 / 27	0 / 27	11 J	2900 J	MA-SB31-SS	1322.148
	Anthracene	120-12-7	21 / 27	0 / 27	14 J	61000 J	MA-SB02-SS	4348.519
	Atrazine	1912-24-9	0 / 27	0 / 27	350 U	11000 UJ	MA-SB02-SS	1492.593
	Benzaldehyde	100-52-7	10 / 27	0 / 27	8 J	1400 J	MA-SB11-SS	930.333
	Benzo(a)anthracene	56-55-3	26 / 27	0 / 27	28 J	120000 J	MA-SB02-SS	8318.630
	Benzo(a)pyrene	50-32-8	25 / 27	0 / 27	40 J	110000 J	MA-SB02-SS	7898.519
	Benzo(b)fluoranthene	205-99-2	24 / 27	0 / 27	65 J	110000 J	MA-SB02-SS	8901.556
	Benzo(g,h,i)perylene	191-24-2	20 / 27	0 / 27	94 J	58000 J	MA-SB02-SS	4082.370
	Benzo(k)fluoranthene	207-08-9	25 / 27	0 / 27	23 J	71000 J	MA-SB02-SS	4994.556
	Biphenyl	92-52-4	9 / 27	0 / 27	47 J	4600 J	MA-SO201-SS	1196.778
	Bromophenyl-4 Phenyl Ether	101-55-3	0 / 27	0 / 27	350 U	11000 UJ	MA-SB02-SS	1492.593
	Butylbenzyl phthalate	85-68-7	7 / 27	0 / 27	43 J	9200 J	MA-SO201-SS	1631.481
	Caprolactam	105-60-2	1 / 27	0 / 27	28 J	28 J	MA-SB56-SS	1419.556
	Carbazole	86-74-8	15 / 27	0 / 27	23 J	12000 J	MA-SB02-SS	1243.741
	Chloroaniline-4	106-47-8	0 / 27	0 / 27	350 U	11000 UJ	MA-SB02-SS	1492.593
	Chloronaphthalene-2	91-58-7	0 / 27	0 / 27	350 U	11000 UJ	MA-SB02-SS	1492.593
	Chlorophenol-2	95-57-8	0 / 27	0 / 27	350 U	11000 UJ	MA-SB02-SS	1492.593
	Chlorophenyl-4 phenyl ether	7005-72-3	0 / 27	0 / 27	350 U	11000 UJ	MA-SB02-SS	1492.593
	Chrysene	218-01-9	26 / 27	0 / 27	38 J	120000 J	MA-SB02-SS	8534.481
	Cresol-4,6-dinitro-ortho	534-52-1	0 / 27	3 / 27	870 U	28000 UJ	MA-SB02-SS	4171.875
	Cresol-o	95-48-7	3 / 27	0 / 27	47 J	1000 J	MA-SO201-SS	1512.556
	Cresol-p	106-44-5	4 / 27	0 / 27	43 J	940 J	MA-SO201-SS	1382.704
	Cresol-parachloro-meta	59-50-7	0 / 27	0 / 27	350 U	11000 UJ	MA-SB02-SS	1492.593
	Dibenzo(a,h)anthracene	53-70-3	20 / 27	0 / 27	12 J	19000 J	MA-SB02-SS	1704.296
	Dibenzofuran	132-64-9	13 / 27	0 / 27	81 J	10000 J	MA-SB02-SS	1263.370
	Dichlorobenzidine-3,3	91-94-1	0 / 27	3 / 27	350 UJ	11000 UJ	MA-SB02-SS	1655.208
	Dichlorophenol-2,4	120-83-2	0 / 27	0 / 27	350 U	11000 UJ	MA-SB02-SS	1492.593
	Dimethylphenol-2,4	105-67-9	1 / 27	0 / 27	65 J	65 J	MA-SB09-SS	1488.333
	Dinitrophenol-2,4	51-28-5	0 / 27	3 / 27	870 UJ	28000 UJ	MA-SB02-SS	4171.875
	Dinitrotoluene-2,4	121-14-2	0 / 27	0 / 27	350 U	11000 UJ	MA-SB02-SS	1492.593
	Dinitrotoluene-2,6	606-20-2	0 / 27	0 / 27	350 U	11000 UJ	MA-SB02-SS	1492.593
	Ether, bis(2-chloroethyl)	111-44-4	0 / 27	0 / 27	350 U	11000 UJ	MA-SB02-SS	1492.593
	Ether, bis-chloroisopropyl	108-60-1	0 / 27	0 / 27	350 U	11000 UJ	MA-SB02-SS	1492.593
	Fluoranthene	206-44-0	26 / 27	0 / 27	43 J	290000 J	MA-SB02-SS	18061.704
	Fluorene	86-73-7	13 / 27	0 / 27	16 J	22000 J	MA-SB02-SS	2070.407
	Hexachlorobenzene	118-74-1	0 / 27	0 / 27	350 U	11000 UJ	MA-SB02-SS	1492.593
	Hexachlorobutadiene	87-68-3	0 / 27	0 / 27	350 U	11000 UJ	MA-SB02-SS	1492.593
	Hexachlorocyclopentadiene	77-47-4	0 / 27	0 / 27	350 UJ	11000 UJ	MA-SB02-SS	1492.593
	Hexachloroethane	67-72-1	0 / 27	0 / 27	350 U	11000 UJ	MA-SB02-SS	1492.593
	Indeno(1,2,3-cd)pyrene	193-39-5	23 / 27	0 / 27	35 J	59000 J	MA-SB02-SS	4638.259
	Isophorone	78-59-1	1 / 27	0 / 27	23 J	23 J	MA-SB09-SS	1486.778
	Methane, bis(2-chloroethoxy)	111-91-1	0 / 27	0 / 27	350 U	11000 UJ	MA-SB02-SS	1492.593
	Methylnaphthalene-2	91-57-6	12 / 27	0 / 27	90 J	7400 J	MA-SB31-SS	1331.481
	Naphthalene	91-20-3	15 / 27	0 / 27	17 J	34000 J	MA-SO201-SS	3093.741
	Nitroaniline-2	88-74-4	0 / 27	0 / 27	870 UJ	28000 UJ	MA-SB02-SS	3761.481
	Nitroaniline-3	99-09-2	0 / 27	0 / 27	870 U	28000 UJ	MA-SB02-SS	3761.481
	Nitroaniline-4	100-01-6	0 / 27	0 / 27	870 U	28000 UJ	MA-SB02-SS	3761.481

TABLE 9
Summary Statistics for Surface Soil (0 to 2 feet) - Martin Aaron, Inc.
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No	Frequency of	Frequency of	Minimum Value	Maximum		Mean
			Detection	Rejected ^a		Value	Max SampleID	Value
Organic Compounds	Nitrobenzene	98-95-3	0 / 27	0 / 27	350 U	11000 UJ	MA-SB02-SS	1492.593 1690.80
	Nitrophenol-2	88-75-5	0 / 27	0 / 27	350 U	11000 UJ	MA-SB02-SS	1492.593 1690.80
	Nitrophenol-4	100-02-7	0 / 27	0 / 27	870 UJ	28000 UJ	MA-SB02-SS	3761.481 4306.33
	Nitroso-di-n-propyl-amine-N	621-64-7	0 / 27	0 / 27	350 UJ	11000 UJ	MA-SB02-SS	1492.593 1690.80
	Nitrosodiphenylamine-n	86-30-6	1 / 27	0 / 27	1300	1300	MA-SO201-SS	1533.148 1671.76
	PCP (Pentachlorophenol)	87-86-5	1 / 27	0 / 27	1100 J	1100 J	MA-SB31-SS	3617.037 4328.54
	Phenanthrene	85-01-8	26 / 27	0 / 27	16 J	220000 J	MA-SB02-SS	14433.889 42718.50
	Phenol	108-95-2	2 / 27	0 / 27	99 J	3200	MA-SO201-SS	1568.296 1722.90
	Phthalate, bis(2-ethylhexyl) (DEHP)	117-81-7	11 / 27	0 / 27	82 J	59000	MA-SO201-SS	5263.407 12660.01
	Phthalate, di-n-butyl	84-74-2	16 / 27	0 / 27	38 J	9100	MA-SB08-SS	1798.000 2606.91
	Phthalate, di-n-octyl	117-84-0	2 / 27	1 / 27	30 J	280 J	MA-SB09-SS	1540.962 1705.55
	Phthalate, diethyl	84-66-2	4 / 27	0 / 27	10 J	5700 J	MA-SO201-SS	1551.926 1830.29
	Phthalate, dimethyl	131-11-3	0 / 27	0 / 27	350 U	11000 UJ	MA-SB02-SS	1492.593 1690.80
	Pyrene	129-00-0	26 / 27	0 / 27	43 J	230000 J	MA-SB02-SS	15073.148 44313.59
	Trichlorophenol-2,4,5	95-95-4	0 / 27	0 / 27	870 U	28000 UJ	MA-SB02-SS	3761.481 4306.33
	Trichlorophenol-2,4,6	88-06-2	0 / 27	0 / 27	350 U	11000 UJ	MA-SB02-SS	1492.593 1690.80
Pesticides/PCBs (ug/kg)	Aldrin	309-00-2	5 / 27	1 / 27	2.6 JN	1300	MA-SB60-SS	62.021 254.73
	BHC, alpha	319-84-6	0 / 27	1 / 27	1.8 U	42 U	MA-SO201-SS	2.765 4.39
	BHC, beta	319-85-7	2 / 27	4 / 27	6.8 J	37	MA-SB60-SS	4.365 8.42
	BHC, delta	319-86-8	0 / 27	1 / 27	1.8 U	42 U	MA-SO201-SS	2.765 4.39
	BHC, gamma (Lindane)	58-89-9	1 / 27	1 / 27	1.9 NJ	1.9 NJ	MA-SO212-SS-1.0	2.800 4.38
	Chlordane - alpha	5103-71-9	16 / 27	2 / 27	1.2 J	8100 JN	MA-SB60-SS	463.550 1621.39
	Chlordane - gamma (technical mixture)	12789-03-6	16 / 27	1 / 27	2.9 J	8900	MA-SB60-SS	503.760 1754.36
	DDD-4,4	72-54-8	1 / 27	1 / 27	8.7	8.7	MA-SB56-SS	5.650 8.51
	DDE-4,4	72-55-9	19 / 27	2 / 27	3.6 J	15000 J	MA-SO201-SS	741.064 2978.62
	DDT-4,4	50-29-3	10 / 27	6 / 27	4.7	2600	MA-SB130-SS	170.257 578.37
	Dieldrin	60-57-1	8 / 27	3 / 27	5.7 JN	1300	MA-SB124-SS	77.463 265.50
	Endosulfan I (alpha)	959-98-8	1 / 27	3 / 27	120	120	MA-SB60-SS	7.485 24.35
	Endosulfan II (beta)	33213-65-9	1 / 27	3 / 27	25 J	25 J	MA-SB124-SS	6.492 9.67
	Endosulfan Sulfate	1031-07-8	6 / 27	2 / 27	9.5 JN	180 JN	MA-SB60-SS	19.198 39.41
	Endrin	72-20-8	9 / 27	1 / 27	3 J	190 J	MA-SB60-SS	24.188 44.62
	Endrin Aldehyde	7421-93-4	4 / 27	3 / 27	10 J	40	MA-SB112-SS	8.435 11.16
	Endrin ketone	53494-70-5	8 / 27	2 / 27	6.8 NJ	120	MA-SO214-SS	18.390 32.17
	Heptachlor	76-44-8	3 / 27	2 / 27	6.8 JN	260 J	MA-SB60-SS	13.658 51.54
	Heptachlor Epoxide	1024-57-3	2 / 27	3 / 27	10 JN	19 J	MA-SB31-SS	3.950 5.74
	Methoxychlor	72-43-5	4 / 27	3 / 27	11 J	1800 J	MA-SB60-SS	121.208 365.69
	Pcb-Aroclor 1016	12674-11-2	0 / 27	1 / 27	35 U	810 U	MA-SO201-SS	53.962 85.17
	Pcb-Aroclor 1221	11104-28-2	0 / 27	1 / 27	71 U	1600 U	MA-SO201-SS	108.077 168.52
	Pcb-Aroclor 1232	11141-16-5	0 / 27	1 / 27	35 U	810 U	MA-SO201-SS	53.962 85.17
	Pcb-Aroclor 1242	53469-21-9	0 / 27	1 / 27	35 U	810 U	MA-SO201-SS	53.962 85.17
	Pcb-Aroclor 1248	12672-29-6	1 / 27	1 / 27	840 J	840 J	MA-SB81-SS	85.481 175.76
	Pcb-Aroclor 1254	11097-69-1	8 / 27	1 / 27	47	19000	MA-SO201-SS	1471.846 4182.21
	Pcb-Aroclor 1260	11096-82-5	3 / 27	0 / 27	110 NJ	7200 J	MA-SB08-SS	321.463 1377.20
	Toxaphene	8001-35-2	0 / 27	1 / 27	180 U	4200 U	MA-SO201-SS	276.346 439.16
VOCs (ug/kg)	Acetone	67-64-1	15 / 27	0 / 27	2 J	460 J	MA-SO214-SS	367.278 1338.72
	Benzene	71-43-2	12 / 27	0 / 27	1 J	4500	MA-SO201-SS	444.204 1568.94
	Bromoform	75-25-2	2 / 27	0 / 27	2 J	2 J	MA-SB04-SS	313.333 1347.30
	Bromomethane	74-83-9	2 / 27	0 / 27	3 J	120 J	MA-SB60-SS	293.907 1346.02
	Carbon disulfide	75-15-0	10 / 27	0 / 27	2 J	130	MA-SB11-SS	318.185 1346.36

TABLE 9
Summary Statistics for Surface Soil (0 to 2 feet) - Martin Aaron, Inc.
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No	Frequency of Detection	Frequency of Rejected ^a	Minimum Value	Maximum		Mean	
						Value	Max SampleID	Value	St Dev
	Carbon tetrachloride	56-23-5	0 / 27	0 / 27	10 U	14000 U	MA-SB31-SS	313.704	1347.21
	Chlorobenzene	108-90-7	2 / 27	0 / 27	5 J	3200	MA-SB60-SS	408.148	1456.63
	Chloroethane	75-00-3	1 / 27	0 / 27	2700 J	2700 J	MA-SB60-SS	389.630	1422.55
	Chloroform	67-66-3	3 / 27	0 / 27	6 J	1400	MA-SO201-SS	341.630	1362.02
	Chloromethane	74-87-3	0 / 27	0 / 27	10 U	14000 U	MA-SB31-SS	313.704	1347.21
	Cyclohexane	110-82-7	4 / 27	0 / 27	1 J	66 J	MA-SB08-SS	315.426	1346.85
	DBCP (1,2-dibromo-3-chloropropane)	96-12-8	0 / 27	0 / 27	10 U	14000 U	MA-SB31-SS	313.685	1347.21
	Dibromochloromethane	124-48-1	0 / 27	0 / 27	10 U	14000 U	MA-SB31-SS	313.704	1347.21
	Dibromoethane-1,2	106-93-4	0 / 27	0 / 27	10 U	14000 U	MA-SB31-SS	313.704	1347.21
	Dichlorobenzene-1,2	95-50-1	5 / 27	0 / 27	1 J	5500	MA-SB60-SS	368.963	1216.33
	Dichlorobenzene-1,3	541-73-1	0 / 27	0 / 27	10 U	14000 U	MA-SB31-SS	313.704	1347.21
	Dichlorobenzene-1,4	106-46-7	2 / 27	0 / 27	170 J	230 J	MA-SB60-SS	280.370	1343.94
	Dichlorobromomethane	75-27-4	0 / 27	0 / 27	10 U	14000 U	MA-SB31-SS	313.704	1347.21
	Dichlorodifluoromethane	75-71-8	0 / 27	0 / 27	10 U	14000 U	MA-SB31-SS	313.704	1347.21
	Dichloroethane-1,1	75-34-3	5 / 27	0 / 27	18 J	11000 J	MA-SB31-SS	618.963	2265.16
	Dichloroethane-1,2	107-06-2	0 / 27	0 / 27	10 U	14000 U	MA-SB31-SS	313.704	1347.21
	Dichloroethene-1,2 trans	156-60-5	3 / 27	0 / 27	3 J	350 J	MA-SB60-SS	302.926	1345.49
	Dichloroethylene-1,1	75-35-4	1 / 27	0 / 27	2 J	2 J	MA-SB02-SS	313.593	1347.24
	Dichloroethylene-1,2 cis	156-59-2	9 / 27	0 / 27	1 J	24000	MA-SB31-SS	1047.759	4629.26
	Dichloropropene-1,2	78-87-5	0 / 27	0 / 27	10 U	14000 U	MA-SB31-SS	313.704	1347.21
	Dichloropropene-1,3 cis	10061-01-5	0 / 27	0 / 27	10 U	14000 U	MA-SB31-SS	313.704	1347.21
	Dichloropropene-1,3 trans	10061-02-6	0 / 27	0 / 27	10 U	14000 U	MA-SB31-SS	313.704	1347.21
	Ethylbenzene	100-41-4	7 / 27	0 / 27	17 J	7500	MA-SO201-SS	640.685	1909.68
	Freon 113 (1,1,2-trichloro-1,2,2-trifluoroethane)	76-13-1	0 / 27	0 / 27	10 U	14000 U	MA-SB31-SS	313.704	1347.21
	Hexanone-2	591-78-6	2 / 27	0 / 27	4 J	410 J	MA-SO201-SS	304.685	1345.73
	Isopropylbenzene	98-82-8	4 / 27	0 / 27	3 J	590 J	MA-SO201-SS	311.130	1346.77
	Methyl acetate	79-20-9	2 / 27	0 / 27	620 J	1300	MA-SB60-SS	336.667	1358.95
	Methyl cyclohexane	108-87-2	9 / 27	0 / 27	1 J	5000 J	MA-SB31-SS	229.204	964.28
	Methyl ethyl ketone (2-butanone)	78-93-3	10 / 27	0 / 27	8 J	250 J	MA-SB60-SS	307.407	1343.78
	Methyl isobutyl ketone (4-methyl-2-pentanone)	108-10-1	6 / 27	0 / 27	1 J	470 J	MA-SB60-SS	311.407	1345.09
	Methyl tertiary butyl ether (MTBE)	1634-04-4	0 / 27	0 / 27	10 U	14000 UJ	MA-SB31-SS	313.704	1347.21
	Methylene chloride	75-09-2	1 / 27	0 / 27	71	71	MA-SB130-SS	316.333	1346.64
	Styrene	100-42-5	1 / 27	0 / 27	7 J	7 J	MA-SB11-SS	313.630	1347.23
	Tetrachloroethane-1,1,2,2	79-34-5	0 / 27	0 / 27	10 U	14000 U	MA-SB31-SS	313.704	1347.21
	Tetrachloroethylene	127-18-4	16 / 27	0 / 27	1 J	26000	MA-SB31-SS	1160.000	5018.50
	Toluene	108-88-3	18 / 27	0 / 27	1 J	160000	MA-SB31-SS	6435.722	30741.44
	Trichlorobenzene-1,2,4	120-82-1	1 / 27	0 / 27	5900	5900	MA-SO201-SS	508.148	1723.84
	Trichloroethane-1,1,1	71-55-6	3 / 27	0 / 27	11	2000	MA-SB60-SS	365.241	1384.31
	Trichloroethane-1,1,2	79-00-5	0 / 27	0 / 27	10 U	14000 U	MA-SB31-SS	313.704	1347.21
	Trichloroethylene	79-01-6	15 / 27	0 / 27	1 J	60000	MA-SB31-SS	2549.389	11581.54
	Trichlorofluoromethane	75-69-4	2 / 27	0 / 27	2 J	3 J	MA-SB130-SS	313.407	1347.28
	Vinyl chloride	75-01-4	3 / 27	0 / 27	9 J	320 J	MA-SB60-SS	302.704	1345.27
	Xylenes, total	1330-20-7	11 / 27	0 / 27	1 J	48000	MA-SO201-SS	3557.537	11797.31
Inorganics (mg/kg)	Aluminum	7429-90-5	27 / 27	0 / 27	2460	13300	MA-SB56-SS	5702.593	2670.37
	Antimony	7440-36-0	0 / 27	0 / 27	0.77 UJ	7.6 BJ	MA-SB31-SS	1.215	0.95
	Arsenic	7440-38-2	27 / 27	0 / 27	2.1 J	766	MA-SB60-SS	99.652	169.45
	Barium	7440-39-3	25 / 27	0 / 27	80.5	37900	MA-SB81-SS	6983.943	10031.86
	Beryllium	7440-41-7	0 / 27	0 / 27	0.12 B	1.2 B	MA-SB81-SS	0.252	0.12
	Cadmium	7440-43-9	20 / 27	0 / 27	1.1	110	MA-SB31-SS	8.381	21.94

TABLE 9
Summary Statistics for Surface Soil (0 to 2 feet) - Martin Aaron, Inc.
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No	Frequency of Detection	Frequency of Rejected ^a	Minimum Value	Maximum		Mean	
						Value	Max SampleID	Value	St Dev
	Calcium	7440-70-2	25 / 27	0 / 27	3700	45800	MA-SO204-SS-0.5	16044.167	11627.24
	Chromium	7440-47-3	27 / 27	0 / 27	9.8	1080	MA-SB124-SS	126.296	225.08
	Cobalt	7440-48-4	4 / 27	0 / 27	11.1	42	MA-SB124-SS	5.648	9.12
	Copper	7440-50-8	26 / 27	0 / 27	6.3	1400	MA-SB130-SS	193.167	308.81
	Iron	7439-89-6	27 / 27	0 / 27	7880	103000	MA-SO201-SS	28318.519	25314.86
	Lead	7439-92-1	27 / 27	0 / 27	8.3	3310	MA-SB97-SS	634.111	738.27
	Magnesium	7439-95-4	21 / 27	0 / 27	1210	16900	MA-SB60-SS	4536.889	4785.40
	Manganese	7439-96-5	27 / 27	0 / 27	21.3	744 J	MA-SB11-SS	272.722	201.23
	Mercury	7439-97-6	22 / 25	0 / 25	0.11 J	3.1	MA-SB56-SS	0.797	0.73
	Nickel	7440-02-0	20 / 27	0 / 27	10.4	576	MA-SB31-SS	40.446	109.62
	Potassium	7440-09-7	3 / 27	0 / 27	711 E	1370 J	MA-SB02-SS	434.241	285.51
	Selenium	7782-49-2	16 / 27	0 / 27	1.1	4.3	MA-SB31-SS	1.246	0.86
	Silver	7440-22-4	2 / 27	0 / 27	12.9	45.7	MA-SB31-SS	2.396	8.99
	Sodium	7440-23-5	11 / 27	0 / 27	1100 J	4770 J	MA-SB81-SS	1029.815	1160.08
	Thallium	7440-28-0	0 / 27	3 / 27	1.1 UJ	1.4 UJ	MA-SB31-SS	0.583	0.05
	Vanadium	7440-62-2	27 / 27	0 / 27	11.4	41.4	MA-SO201-SS	23.304	8.34
	Zinc	7440-66-6	27 / 27	0 / 27	9.9	6640	MA-SB81-SS	838.489	1295.90

Notes

^anumber of samples, out of the total samples from FOD, for which data were rejected

303145

TABLE 10
Summary Statistics for Surface Soil (0 to 2 feet) - South Jersey Port Corporation
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No	Frequency of Detection	Frequency of Rejected ^a	Minimum Value	Maximum		Mean	
						Value	Max SampleID	Value	St Dev
SVOCs (ug/kg)	Acenaphthene	83-32-9	4 / 14	0 / 14	47 J	34000 J	MA-SO301-SS-1.0	5075.143	9701.034
	Acenaphthylene	208-96-8	2 / 14	0 / 14	59 J	380 J	MA-SB72-SS-0.5	6986.714	16045.237
	Acetophenone	98-86-2	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Anthracene	120-12-7	8 / 14	0 / 14	120 J	65000 J	MA-SO301-SS-1.0	7155.357	17396.004
	Atrazine	1912-24-9	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Benzaldehyde	100-52-7	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Benzo(a)anthracene	56-55-3	11 / 14	0 / 14	200 J	130000 J	MA-SO301-SS-1.0	12578.571	34165.915
	Benzo(a)pyrene	50-32-8	11 / 14	0 / 14	200 J	97000 J	MA-SO301-SS-1.0	10047.143	25518.795
	Benzo(b)fluoranthene	205-99-2	11 / 14	0 / 14	270 J	97000 J	MA-SO301-SS-1.0	10075.000	25511.150
	Benzo(g,h,i)perylene	191-24-2	10 / 14	0 / 14	100 J	34000 J	MA-SO301-SS-1.0	4864.286	9790.840
	Benzo(k)fluoranthene	207-08-9	11 / 14	0 / 14	210 J	110000 J	MA-SO301-SS-1.0	10857.857	28963.783
	Biphenyl	92-52-4	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Bromophenyl-4 Phenyl Ether	101-55-3	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Butylbenzyl phthalate	85-68-7	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Caprolactam	105-60-2	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Carbazole	86-74-8	5 / 14	0 / 14	100 J	43000 J	MA-SO301-SS-1.0	5678.929	11847.373
	Chloroaniline-4	106-47-8	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Chloronaphthalene-2	91-58-7	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Chlorophenol-2	95-57-8	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Chlorophenyl-4 phenyl ether	7005-72-3	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Chrysene	218-01-9	11 / 14	0 / 14	270 J	130000 J	MA-SO301-SS-1.0	12670.714	34134.737
	Cresol-4,6-dinitro-ortho	534-52-1	0 / 14	0 / 14	900 UJ	300000 UJ	MA-SO301-SS-1.0	17742.857	39984.809
	Cresol-o	95-48-7	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Cresol-p	106-44-5	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Cresol-parachloro-meta	59-50-7	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Dibenzo(a,h)anthracene	53-70-3	4 / 14	0 / 14	61 J	800 J	MA-SO303-SS-1.0	6822.571	16107.473
	Dibenzofuran	132-64-9	3 / 14	0 / 14	78 J	27000 J	MA-SO301-SS-1.0	4657.357	8114.022
	Dichlorobenzidine-3,3	91-94-1	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Dichlorophenol-2,4	120-83-2	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Dimethylphenol-2,4	105-67-9	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Dinitrophenol-2,4	51-28-5	0 / 14	0 / 14	900 UJ	300000 UJ	MA-SO301-SS-1.0	17742.857	39984.809
	Dinitrotoluene-2,4	121-14-2	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Dinitrotoluene-2,6	606-20-2	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Ether, bis(2-chloroethyl)	111-44-4	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Ether, bis-chloroisopropyl	108-60-1	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Fluoranthene	206-44-0	12 / 14	0 / 14	310 J	330000 J	MA-SO301-SS-1.0	28200.714	87049.216
	Fluorene	86-73-7	4 / 14	0 / 14	96 J	42000 J	MA-SO301-SS-1.0	5680.786	11572.334
	Hexachlorobenzene	118-74-1	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Hexachlorobutadiene	87-68-3	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Hexachlorocyclopentadiene	77-47-4	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Hexachloroethane	67-72-1	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Indeno(1,2,3-cd)pyrene	193-39-5	10 / 14	0 / 14	130 J	40000 J	MA-SO301-SS-1.0	5385.714	11159.211
	Isophorone	78-59-1	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Methane, bis(2-chloroethoxy)	111-91-1	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Methylnaphthalene-2	91-57-6	2 / 14	0 / 14	69 J	410 J	MA-SO303-SS-1.0	6986.000	16045.194
	Naphthalene	91-20-3	2 / 14	0 / 14	91 J	650 J	MA-SO303-SS-1.0	7004.714	16037.023
	Nitroaniline-2	88-74-4	0 / 14	0 / 14	900 UJ	300000 UJ	MA-SO301-SS-1.0	17742.857	39984.809

TABLE 10
Summary Statistics for Surface Soil (0 to 2 feet) - South Jersey Port Corporation
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No	Frequency of Detection	Frequency of Rejected ^a	Minimum Value	Maximum		Mean	
						Value	Max SampleID	Value	St Dev
Organic Compounds	Nitroaniline-3	99-09-2	0 / 14	0 / 14	900 UJ	300000 UJ	MA-SO301-SS-1.0	17742.857	39984.809
	Nitroaniline-4	100-01-6	0 / 14	0 / 14	900 UJ	300000 UJ	MA-SO301-SS-1.0	17742.857	39984.809
	Nitrobenzene	98-95-3	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Nitrophenol-2	88-75-5	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Nitrophenol-4	100-02-7	0 / 14	0 / 14	900 UJ	300000 UJ	MA-SO301-SS-1.0	17742.857	39984.809
	Nitroso-di-n-propyl-amine-N	621-64-7	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Nitrosodiphenylamine-n	86-30-6	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	PCP (Pentachlorophenol)	87-86-5	0 / 14	0 / 14	900 UJ	300000 UJ	MA-SO301-SS-1.0	17742.857	39984.809
	Phenanthrene	85-01-8	10 / 14	0 / 14	200 J	340000 J	MA-SO301-SS-1.0	28301.429	89864.730
	Phenol	108-95-2	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Phthalate, bis(2-ethylhexyl) (DEHP)	117-81-7	3 / 14	0 / 14	46 J	240 J	MA-SB62-SS-1	7017.571	16035.816
	Phthalate, di-n-butyl	84-74-2	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Phthalate, di-n-octyl	117-84-0	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Phthalate, diethyl	84-66-2	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Phthalate, dimethyl	131-11-3	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
	Pyrene	129-00-0	12 / 14	0 / 14	260 J	220000 J	MA-SO301-SS-1.0	19877.143	57840.163
	Trichlorophenol-2,4,5	95-95-4	0 / 14	0 / 14	900 UJ	300000 UJ	MA-SO301-SS-1.0	17742.857	39984.809
	Trichlorophenol-2,4,6	88-06-2	0 / 14	0 / 14	360 UJ	120000 UJ	MA-SO301-SS-1.0	7096.786	16000.642
Pesticides/PCBs (ug/kg)	Aldrin	309-00-2	0 / 14	0 / 14	1.8 UJ	2 UJ	MA-SB77-SS-1.0	0.954	0.024
	BHC, alpha	319-84-6	0 / 14	0 / 14	1.8 UJ	2 UJ	MA-SB77-SS-1.0	0.954	0.024
	BHC, beta	319-85-7	0 / 14	0 / 14	1.8 UJ	2 UJ	MA-SB77-SS-1.0	0.954	0.024
	BHC, delta	319-86-8	0 / 14	0 / 14	1.8 UJ	2 UJ	MA-SB77-SS-1.0	0.954	0.024
	BHC, gamma (Lindane)	58-89-9	0 / 14	0 / 14	1.8 UJ	2 UJ	MA-SB77-SS-1.0	0.954	0.024
	Chlordane - alpha	5103-71-9	1 / 14	0 / 14	2 J	2 J	MA-SB69-SS-1.0	1.029	0.281
	Chlordane - gamma (technical mixture)	12789-03-6	1 / 14	3 / 14	4.8 J	4.8 J	MA-SB29-SS-1.0	1.300	1.161
	DDD-4,4	72-54-8	1 / 14	0 / 14	5 J	5 J	MA-SB66-SS-0.5	2.082	0.841
	DDE-4,4	72-55-9	2 / 14	1 / 14	4.9 J	6.1 J	MA-SB62-SS-1	2.412	1.393
	DDT-4,4	50-29-3	4 / 14	0 / 14	3.8 J	6.8 J	MA-SB66-SS-0.5	2.836	1.712
	Dieldrin	60-57-1	0 / 14	0 / 14	3.6 UJ	3.9 UJ	MA-SB77-SS-1.0	1.857	0.051
	Endosulfan I (alpha)	959-98-8	1 / 14	0 / 14	2.3 J	2.3 J	MA-SB69-SS-1.0	1.050	0.361
	Endosulfan II (beta)	33213-65-9	0 / 14	0 / 14	3.6 UJ	3.9 UJ	MA-SB77-SS-1.0	1.857	0.051
	Endosulfan Sulfate	1031-07-8	0 / 14	1 / 14	3.6 UJ	3.9 UJ	MA-SB77-SS-1.0	1.850	0.046
	Endrin	72-20-8	1 / 14	0 / 14	49 J	49 J	MA-SO301-SS-1.0	5.218	12.601
	Endrin Aldehyde	7421-93-4	0 / 14	0 / 14	3.6 UJ	3.9 UJ	MA-SB77-SS-1.0	1.857	0.051
	Endrin ketone	53494-70-5	3 / 14	0 / 14	4 J	8.4 J	MA-SB67-SS-1.0	2.793	2.039
	Heptachlor	76-44-8	1 / 14	0 / 14	4.9 J	4.9 J	MA-SO301-SS-1.0	1.232	1.056
	Heptachlor Epoxide	1024-57-3	0 / 14	0 / 14	1.8 UJ	2 UJ	MA-SB77-SS-1.0	0.954	0.024
	Methoxychlor	72-43-5	0 / 14	0 / 14	18 UJ	20 UJ	MA-SB77-SS-1.0	9.536	0.237
	Pcb-Aroclor 1016	12674-11-2	0 / 14	0 / 14	36 UJ	39 UJ	MA-SB77-SS-1.0	18.571	0.514
	Pcb-Aroclor 1221	11104-28-2	0 / 14	0 / 14	73 UJ	80 UJ	MA-SO301-SS-1.0	37.750	1.070
	Pcb-Aroclor 1232	11141-16-5	0 / 14	0 / 14	36 UJ	39 UJ	MA-SB77-SS-1.0	18.571	0.514
	Pcb-Aroclor 1242	53469-21-9	0 / 14	0 / 14	36 UJ	39 UJ	MA-SB77-SS-1.0	18.571	0.514
	Pcb-Aroclor 1248	12672-29-6	0 / 14	0 / 14	36 UJ	39 UJ	MA-SB77-SS-1.0	18.571	0.514
	Pcb-Aroclor 1254	11097-69-1	0 / 14	0 / 14	36 UJ	39 UJ	MA-SB77-SS-1.0	18.571	0.514
	Pcb-Aroclor 1260	11096-82-5	0 / 14	0 / 14	36 UJ	39 UJ	MA-SB77-SS-1.0	18.571	0.514
	Toxaphene	8001-35-2	0 / 14	0 / 14	180 UJ	200 UJ	MA-SB77-SS-1.0	95.357	2.373
VOCs (ug/kg)	Acetone	67-64-1	6 / 14	0 / 14	4 J	21	MA-SB72-SS-0.5	11.750	5.147

TABLE 10
Summary Statistics for Surface Soil (0 to 2 feet) - South Jersey Port Corporation
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No	Frequency of	Frequency of	Minimum	Maximum	Mean	
			Detection	Rejected ^a	Value	Value	Max SampleID	Value
	Benzene	71-43-2	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Bromoform	75-25-2	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Bromomethane	74-83-9	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Carbon disulfide	75-15-0	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Carbon tetrachloride	56-23-5	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Chlorobenzene	108-90-7	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Chloroethane	75-00-3	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Chloroform	67-66-3	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Chloromethane	74-87-3	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Cyclohexane	110-82-7	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	DBCP (1,2-dibromo-3-chloropropane)	96-12-8	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Dibromochloromethane	124-48-1	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Dibromoethane-1,2	106-93-4	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Dichlorobenzene-1,2	95-50-1	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Dichlorobenzene-1,3	541-73-1	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Dichlorobenzene-1,4	106-46-7	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Dichlorobromomethane	75-27-4	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Dichlorodifluoromethane	75-71-8	0 / 14	0 / 14	10 UJ	15 UJ	MA-SO301-SS-1.0	6.036 0.771
	Dichloroethane-1,1	75-34-3	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Dichloroethane-1,2	107-06-2	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Dichlorethane-1,2 trans	156-60-5	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Dichloroethylene-1,1	75-35-4	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Dichloroethylene-1,2 cis	156-59-2	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Dichloropropane-1,2	78-87-5	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Dichloropropene-1,3 cis	10061-01-5	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Dichloropropene-1,3 trans	10061-02-6	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Ethylbenzene	100-41-4	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Freon 113 (1,1,2-trichloro-1,2,2-trifluoroethane)	76-13-1	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Hexanone-2	591-78-6	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Isopropylbenzene	98-82-8	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Methyl acetate	79-20-9	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Methyl cyclohexane	108-87-2	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Methyl ethyl ketone (2-butanone)	78-93-3	1 / 14	0 / 14	8 J	8 J	MA-SB67-SS-1.0	6.214 0.914
	Methyl isobutyl ketone (4-methyl-2-pentanone)	108-10-1	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Methyl tertiary butyl ether (MTBE)	1634-04-4	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Methylene chloride	75-09-2	0 / 14	0 / 14	11 U	32 U	MA-SB68-SS-1.0	7.750 2.629
	Styrene	100-42-5	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Tetrachloroethane-1,1,2,2	79-34-5	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Tetrachloroethylene	127-18-4	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Toluene	108-88-3	1 / 14	0 / 14	2 J	2 J	MA-SB68-SS-1.0	5.750 1.327
	Trichlorobenzene-1,2,4	120-82-1	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Trichloroethane-1,1,1	71-55-6	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Trichloroethane-1,1,2	79-00-5	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Trichloroethylene	79-01-6	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Trichlorofluoromethane	75-69-4	2 / 14	0 / 14	1 J	1 J	MA-SB66-SS-0.5	5.357 1.994
	Vinyl chloride	75-01-4	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771
	Xylenes, total	1330-20-7	0 / 14	0 / 14	10 U	15 U	MA-SO301-SS-1.0	6.036 0.771

TABLE 10
Summary Statistics for Surface Soil (0 to 2 feet) - South Jersey Port Corporation
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No	Frequency of Detection	Frequency of Rejected ^a	Minimum Value	Maximum		Mean	
						Value	Max SampleID	Value	St Dev
Inorganics (mg/kg)	Aluminum	7429-90-5	14 / 14	0 / 14	3150	9000	MA-SB68-SS-1.0	5094.286	1489.175
	Antimony	7440-36-0	6 / 14	0 / 14	0.88 J	1.9 J	MA-SB75-SS-1.0	0.943	0.622
	Arsenic	7440-38-2	14 / 14	0 / 14	3.3	46.4	MA-SB29-SS-1.0	18.243	12.620
	Barium	7440-39-3	14 / 14	0 / 14	62.4	5070	MA-SB78-SS-0.5	1407.814	1518.000
	Beryllium	7440-41-7	1 / 14	0 / 14	0.33 J	0.33 J	MA-SO303-SS-1.0	0.179	0.074
	Cadmium	7440-43-9	5 / 14	0 / 14	1.1	5.1	MA-SO302-SS-1.0	1.265	1.614
	Calcium	7440-70-2	14 / 14	0 / 14	1220	34100	MA-SB68-SS-1.0	7777.857	8252.332
	Chromium	7440-47-3	14 / 14	0 / 14	9.8 J	189 J	MA-SB75-SS-1.0	35.393	47.133
	Cobalt	7440-48-4	0 / 14	0 / 14	2.7 B	8.3 B	MA-SO301-SS-1.0	2.325	0.846
	Copper	7440-50-8	14 / 14	0 / 14	11.4	358	MA-SO302-SS-1.0	88.943	86.141
	Iron	7439-89-6	14 / 14	0 / 14	9820	27600	MA-SO302-SS-1.0	16680.000	5479.955
	Lead	7439-92-1	14 / 14	0 / 14	34.6	1110	MA-SO301-SS-1.0	521.186	371.461
	Magnesium	7439-95-4	9 / 14	0 / 14	1060	3330	MA-SB77-SS-1.0	1284.179	910.072
	Manganese	7439-96-5	14 / 14	0 / 14	103 J	488 J	MA-SB72-SS-0.5	176.857	100.701
	Mercury	7439-97-6	13 / 14	1 / 14	0.21	1.5	MA-SB75-SS-1.0	0.626	0.365
	Nickel	7440-02-0	2 / 14	9 / 14	10	10.6	MA-SB78-SS-0.5	6.660	3.348
	Potassium	7440-09-7	0 / 14	0 / 14	323 B	791 B	MA-SB78-SS-0.5	272.500	67.492
	Selenium	7782-49-2	6 / 14	0 / 14	1.1	2.5	MA-SO301-SS-1.0	1.067	0.675
	Silver	7440-22-4	6 / 14	0 / 14	0.22 J	2 J	MA-SB29-SS-1.0	0.364	0.516
	Sodium	7440-23-5	3 / 14	0 / 14	582 J	1470 J	MA-SB75-SS-1.0	504.143	409.239
	Thallium	7440-28-0	0 / 14	0 / 14	1.1 UJ	1.3 UJ	MA-SO301-SS-1.0	0.575	0.033
	Vanadium	7440-62-2	14 / 14	0 / 14	14.8	33.6	MA-SO302-SS-1.0	21.979	5.688
	Zinc	7440-66-6	4 / 14	10 / 14	54.1	550	MA-SB78-SS-0.5	354.025	218.130

Notes

^anumber of samples, out of the total samples from FOD, for which data were rejected

TABLE 11
Summary Statistics for Ground Water - Shallow Monitoring Wells from Round 1 (June 2002)
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No	Frequency of	Frequency of	Minimum Value	Maximum		Mean	
			Detection	Rejected ^a		Value	Max SampleID	Value	St Dev
SVOCs (ug/L)	Acenaphthene	83-32-9	1 / 18	0 / 18	1.8 J	1.8 J	MA-MW-5S-R1	10.656	34.78
	Acenaphthylene	208-96-8	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Acetophenone	98-86-2	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Anthracene	120-12-7	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Atrazine	1912-24-9	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Benzaldehyde	100-52-7	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Benzo(a)anthracene	56-55-3	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Benzo(a)pyrene	50-32-8	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Benzo(b)fluoranthene	205-99-2	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Benzo(g,h,i)perylene	191-24-2	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Benzo(k)fluoranthene	207-08-9	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Biphenyl	92-52-4	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Bromophenyl-4 Phenyl Ether	101-55-3	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Butylbenzyl phthalate	85-68-7	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Caprolactam	105-60-2	1 / 18	0 / 18	1.5 J	1.5 J	MA-MW-8S-R1	10.639	34.78
	Chloroaniline-4	106-47-8	0 / 18	4 / 18	5 UJ	300 U	MA-MW-13S-R1	13.036	39.42
	Chloronaphthalene-2	91-58-7	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Chlorophenol-2	95-57-8	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Chlorophenyl-4 phenyl ether	7005-72-3	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Chrysene	218-01-9	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Cresol-4,6-dinitro-ortho	534-52-1	0 / 18	0 / 18	20 UJ	1200 U	MA-MW-13S-R1	42.778	139.06
	Cresol-o	95-48-7	2 / 18	0 / 18	2.9 J	490	MA-MW-13S-R1	29.606	114.90
	Cresol-p	106-44-5	3 / 18	0 / 18	5.9	1400	MA-MW-13S-R1	80.539	329.30
	Cresol-parachloro-meta	59-50-7	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Dibenz(a,h)anthracene	53-70-3	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Dibenzofuran	132-64-9	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Dichlorobenzidine-3,3	91-94-1	0 / 18	4 / 18	5 UJ	300 U	MA-MW-13S-R1	13.036	39.42
	Dichlorophenol-2,4	120-83-2	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Dimethylphenol-2,4	105-67-9	1 / 18	0 / 18	1.7 J	1.7 J	MA-MW-15S-R1	10.650	34.78
	Dinitrophenol-2,4	51-28-5	0 / 18	1 / 18	20 UJ	1200 U	MA-MW-13S-R1	44.706	143.10
	Dinitrotoluene-2,4	121-14-2	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Dinitrotoluene-2,6	606-20-2	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Ether, bis(2-chloroethyl)	111-44-4	2 / 18	0 / 18	1.9 J	7.2	MA-MW-9S-R1	10.922	34.73
	Ether, bis-chloroisopropyl	108-60-1	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Fluoranthene	206-44-0	1 / 18	0 / 18	3.3 J	3.3 J	MA-MW-5S-R1	10.739	34.76
	Fluorene	86-73-7	1 / 18	0 / 18	1.7 J	1.7 J	MA-MW-5S-R1	10.650	34.78
	Hexachlorobenzene	118-74-1	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Hexachlorobutadiene	87-68-3	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Hexachlorocyclopentadiene	77-47-4	0 / 18	4 / 18	5 UJ	300 U	MA-MW-13S-R1	13.036	39.42
	Hexachloroethane	67-72-1	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Indeno(1,2,3-cd)pyrene	193-39-5	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Isophorone	78-59-1	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Methane, bis(2-chloroethoxy)	111-91-1	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Methylnaphthalene-2	91-57-6	2 / 18	0 / 18	1.2 J	1.8 J	MA-MW-5S-R1	10.583	34.80
	Naphthalene	91-20-3	3 / 18	0 / 18	38	2600	MA-MW-13S-R1	159.194	610.76
	Nitroaniline-2	88-74-4	0 / 18	1 / 18	20 UJ	1200 U	MA-MW-13S-R1	44.706	143.10
	Nitroaniline-3	99-09-2	0 / 18	1 / 18	20 UJ	1200 U	MA-MW-13S-R1	44.706	143.10
	Nitroaniline-4	100-01-6	0 / 18	1 / 18	20 UJ	1200 U	MA-MW-13S-R1	44.706	143.10

TABLE 11
Summary Statistics for Ground Water - Shallow Monitoring Wells from Round 1 (June 2002)
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No	Frequency of Detection	Frequency of Rejected ^a	Minimum Value	Maximum		Mean	
						Value	Max SampleID	Value	St Dev
Organic Compounds	Nitrobenzene	98-95-3	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Nitrophenol-2	88-75-5	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Nitrophenol-4	100-02-7	0 / 18	1 / 18	20 UJ	1200 U	MA-MW-13S-R1	44.706	143.10
	Nitroso-di-n-propyl-amine-N	621-64-7	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Nitrosodiphenylamine-n	86-30-6	4 / 18	0 / 18	1.7 J	70 J	MA-MW-13S-R1	6.900	15.98
	PCP (Pentachlorophenol)	87-86-5	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Phenanthrene	85-01-8	1 / 18	0 / 18	10	10	MA-MW-5S-R1	11.111	34.71
	Phenol	108-95-2	3 / 18	0 / 18	1.1 J	7200	MA-MW-13S-R1	402.978	1696.32
	Phthalate, bis(2-ethylhexyl) (DEHP)	117-81-7	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Phthalate, di-n-butyl	84-74-2	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Phthalate, di-n-octyl	117-84-0	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Phthalate, diethyl	84-66-2	1 / 18	0 / 18	2.5 J	2.5 J	MA-MW-16S-R1	10.694	34.77
	Phthalate, dimethyl	131-11-3	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Pyrene	129-00-0	1 / 18	0 / 18	3.3 J	3.3 J	MA-MW-5S-R1	10.739	34.76
	Tetrachlorobenzene-1,2,4,5	95-94-3	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
	Trichlorophenol-2,4,5	95-95-4	0 / 18	0 / 18	20 UJ	1200 U	MA-MW-13S-R1	42.778	139.06
	Trichlorophenol-2,4,6	88-06-2	0 / 18	0 / 18	5 UJ	300 U	MA-MW-13S-R1	10.694	34.77
Pesticides/PCBs (ug/L)	Aldrin	309-00-2	0 / 18	4 / 18	0.01 UJ	0.01 UJ	MA-MW-1S-R1	0.005	0.00
	BHC, alpha	319-84-6	0 / 18	3 / 18	0.01 UJ	0.01 UJ	MA-MW-1S-R1	0.005	0.00
	BHC, beta	319-85-7	0 / 18	4 / 18	0.01 UJ	0.01 UJ	MA-MW-1S-R1	0.005	0.00
	BHC, delta	319-86-8	1 / 18	3 / 18	0.014 J	0.014 J	MA-MW-15S-R1	0.006	0.00
	BHC, gamma (Lindane)	58-89-9	1 / 18	3 / 18	0.03 NJ	0.03 NJ	MA-MW-15S-R1	0.007	0.01
	Chlordane - alpha	5103-71-9	3 / 18	1 / 18	0.026 NJ	0.15	MA-MW-14S-R1	0.019	0.04
	Chlordane - gamma (technical mixture)	12789-03-6	2 / 18	1 / 18	0.062	0.091 J	MA-MW-14S-R1	0.013	0.02
	DDD-4,4	72-54-8	0 / 18	1 / 18	0.02 U	0.02 U	MA-MW-1S-R1	0.010	0.00
	DDE-4,4	72-55-9	2 / 18	1 / 18	0.028 NJ	0.039 J	MA-MW-12S-R1	0.013	0.01
	DDT-4,4	50-29-3	1 / 18	1 / 18	0.022 NJ	0.022 NJ	MA-MW-12S-R1	0.011	0.00
	Dieldrin	60-57-1	3 / 18	1 / 18	0.032 NJ	0.099 J	MA-MW-12S-R1	0.019	0.02
	Endosulfan I (alpha)	959-98-8	0 / 18	1 / 18	0.01 U	0.01 U	MA-MW-1S-R1	0.005	0.00
	Endosulfan II (beta)	33213-65-9	0 / 18	1 / 18	0.02 U	0.02 U	MA-MW-1S-R1	0.010	0.00
	Endosulfan Sulfate	1031-07-8	0 / 18	1 / 18	0.02 U	0.02 U	MA-MW-1S-R1	0.010	0.00
	Endrin	72-20-8	0 / 18	1 / 18	0.02 U	0.02 U	MA-MW-1S-R1	0.010	0.00
	Endrin Aldehyde	7421-93-4	0 / 18	1 / 18	0.02 U	0.02 U	MA-MW-1S-R1	0.010	0.00
	Endrin ketone	53494-70-5	0 / 18	1 / 18	0.02 U	0.02 U	MA-MW-1S-R1	0.010	0.00
	Heptachlor	76-44-8	0 / 18	3 / 18	0.01 UJ	0.01 UJ	MA-MW-1S-R1	0.005	0.00
	Heptachlor Epoxide	1024-57-3	1 / 18	1 / 18	0.055 J	0.055 J	MA-MW-13S-R1	0.008	0.01
	Methoxychlor	72-43-5	0 / 18	1 / 18	0.1 U	0.1 U	MA-MW-1S-R1	0.050	0.00
	Pcb-Aroclor 1016	12674-11-2	0 / 18	1 / 18	0.2 U	0.2 U	MA-MW-1S-R1	0.100	0.00
	Pcb-Aroclor 1221	11104-28-2	0 / 18	1 / 18	0.4 U	0.4 U	MA-MW-1S-R1	0.200	0.00
	Pcb-Aroclor 1232	11141-16-5	0 / 18	1 / 18	0.2 U	0.2 U	MA-MW-1S-R1	0.100	0.00
	Pcb-Aroclor 1242	53469-21-9	0 / 18	1 / 18	0.2 U	0.2 U	MA-MW-1S-R1	0.100	0.00
	Pcb-Aroclor 1248	12672-29-6	0 / 18	1 / 18	0.2 U	0.2 U	MA-MW-1S-R1	0.100	0.00
	Pcb-Aroclor 1254	11097-69-1	0 / 18	1 / 18	0.2 U	0.2 U	MA-MW-1S-R1	0.100	0.00
	Pcb-Aroclor 1260	11096-82-5	0 / 18	1 / 18	0.2 U	0.2 U	MA-MW-1S-R1	0.100	0.00
	Toxaphene	8001-35-2	0 / 18	1 / 18	1 U	1 U	MA-MW-1S-R1	0.500	0.00
	Acetone	67-64-1	1 / 18	10 / 18	16 J	16 J	MA-MW-5S-R1	4.188	4.77
	Benzene	71-43-2	7 / 18	6 / 18	0.53 J	150 J	MA-MW-5S-R1	21.235	45.15
	Bromoform	75-25-2	1 / 18	3 / 18	0.64 J	0.64 J	MA-MW-9S-R1	0.276	0.10

TABLE 11
Summary Statistics for Ground Water - Shallow Monitoring Wells from Round 1 (June 2002)
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No	Frequency of Detection	Frequency of Rejected ^a	Minimum Value	Maximum		Mean	
						Value	Max SampleID	Value	St Dev
	Bromomethane	74-83-9	0 / 18	4 / 18	0.5 UJ	0.5 UJ	MA-MW-1S-R1	0.250	0.00
	Carbon disulfide	75-15-0	2 / 18	7 / 18	0.84 J	19 J	MA-MW-13S-R1	2.008	5.64
	Carbon tetrachloride	56-23-5	0 / 18	4 / 18	0.5 UJ	0.5 UJ	MA-MW-1S-R1	0.250	0.00
	Chlorobenzene	108-90-7	3 / 18	9 / 18	0.78 J	2.3 J	MA-MW-5S-R1	0.709	0.79
	Chlorobromomethane	74-97-5	0 / 18	4 / 18	0.5 UJ	0.5 UJ	MA-MW-1S-R1	0.250	0.00
	Chloroethane	75-00-3	3 / 18	2 / 18	2.4 J	5.3 J	MA-MW-16S-R1	0.928	1.55
	Chloroform	67-66-3	0 / 18	4 / 18	0.5 UJ	0.5 UJ	MA-MW-1S-R1	0.250	0.00
	Chloromethane	74-87-3	0 / 18	4 / 18	0.5 UJ	0.5 UJ	MA-MW-1S-R1	0.250	0.00
	Cyclohexane	110-82-7	4 / 18	6 / 18	1.7 J	53 J	MA-MW-5S-R1	5.408	15.07
	DBCP (1,2-dibromo-3-chloropropane)	96-12-8	0 / 18	4 / 18	0.5 UJ	0.5 UJ	MA-MW-1S-R1	0.250	0.00
	Dibromochloromethane	124-48-1	0 / 18	4 / 18	0.5 UJ	0.5 UJ	MA-MW-1S-R1	0.250	0.00
	Dibromoethane-1,2	106-93-4	0 / 18	4 / 18	0.5 UJ	0.5 UJ	MA-MW-1S-R1	0.250	0.00
	Dichlorobenzene-1,2	95-50-1	4 / 18	9 / 18	0.83 J	14 J	MA-MW-13S-R1	3.131	5.04
	Dichlorobenzene-1,3	541-73-1	0 / 18	11 / 18	0.5 U	0.5 U	MA-MW-4S-R1	0.250	0.00
	Dichlorobenzene-1,4	106-46-7	1 / 18	11 / 18	1.8 J	1.8 J	MA-MW-12S-R1	0.471	0.59
	Dichlorobromomethane	75-27-4	0 / 18	4 / 18	0.5 UJ	0.5 UJ	MA-MW-1S-R1	0.250	0.00
	Dichlorodifluoromethane	75-71-8	0 / 18	4 / 18	0.5 UJ	0.5 UJ	MA-MW-1S-R1	0.250	0.00
	Dichloroethane-1,1	75-34-3	7 / 18	2 / 18	1.1	120 J	MA-MW-16S-R1	9.059	29.67
	Dichloroethane-1,2	107-06-2	1 / 18	4 / 18	1.5 J	1.5 J	MA-MW-15S-R1	0.339	0.33
	Dichloroethene-1,2 trans	156-60-5	4 / 18	3 / 18	0.57 J	15	MA-MW-14S-R1	2.061	4.52
	Dichloroethylene-1,1	75-35-4	0 / 18	4 / 18	0.5 UJ	0.5 UJ	MA-MW-1S-R1	0.250	0.00
	Dichloroethylene-1,2 cis	156-59-2	8 / 18	0 / 18	0.71 J	320	MA-MW-14S-R1	30.173	83.60
	Dichloropropane-1,2	78-87-5	1 / 18	3 / 18	1.2 J	1.2 J	MA-MW-9S-R1	0.313	0.25
	Dichloropropene-1,3 cis	10061-01-5	0 / 18	4 / 18	0.5 UJ	0.5 UJ	MA-MW-1S-R1	0.250	0.00
	Dichloropropene-1,3 trans	10061-02-6	0 / 18	4 / 18	0.5 UJ	0.5 UJ	MA-MW-1S-R1	0.250	0.00
	Ethylbenzene	100-41-4	5 / 18	8 / 18	1.6 J	45 J	MA-MW-13S-R1	11.065	17.09
	Freon 113 (1,1,2-trichloro-1,2,2-trifluoroethane)	76-13-1	0 / 18	4 / 18	0.5 UJ	0.5 UJ	MA-MW-1S-R1	0.250	0.00
	Hexanone-2	591-78-6	0 / 18	11 / 18	5 UJ	5 UJ	MA-MW-4S-R1	2.500	0.00
	Isopropylbenzene	98-82-8	4 / 18	8 / 18	2.3 J	13 J	MA-MW-5S-R1	3.210	5.23
	Methyl acetate	79-20-9	0 / 18	13 / 18	0.5 UJ	0.5 UJ	MA-MW-1S-R1	0.250	0.00
	Methyl cyclohexane	108-87-2	5 / 18	7 / 18	0.87 J	200 J	MA-MW-5S-R1	19.661	59.87
	Methyl ethyl ketone (2-butanone)	78-93-3	1 / 18	10 / 18	180 J	180 J	MA-MW-13S-R1	24.688	62.76
	Methyl isobutyl ketone (4-methyl-2-pentanone)	108-10-1	1 / 18	10 / 18	240 J	240 J	MA-MW-13S-R1	32.188	83.97
	Methyl tertiary butyl ether (MTBE)	1634-04-4	8 / 18	5 / 18	0.87	11 J	MA-MW-5S-R1	2.463	3.57
	Methylene chloride	75-09-2	0 / 18	4 / 18	0.5 UJ	0.5 UJ	MA-MW-1S-R1	0.250	0.00
	Styrene	100-42-5	0 / 18	11 / 18	0.5 U	0.5 U	MA-MW-4S-R1	0.250	0.00
	Tetrachloroethane-1,1,2,2	79-34-5	0 / 18	4 / 18	0.5 UJ	0.5 UJ	MA-MW-1S-R1	0.250	0.00
	Tetrachloroethylene	127-18-4	3 / 18	2 / 18	0.55 J	0.86 J	MA-MW-9S-R1	0.338	0.20
	Toluene	108-88-3	6 / 18	6 / 18	0.51	17 J	MA-MW-13S-R1	2.367	4.85
	Trichlorobenzene-1,2,3	87-61-6	2 / 18	9 / 18	0.68	3.3 J	MA-MW-13S-R1	0.637	1.01
	Trichlorobenzene-1,2,4	120-82-1	3 / 18	9 / 18	1.9	11 J	MA-MW-13S-R1	1.944	3.55
	Trichloroethane-1,1,1	71-55-6	3 / 18	3 / 18	0.55 J	87 J	MA-MW-16S-R1	9.370	25.00
	Trichloroethane-1,1,2	79-00-5	0 / 18	4 / 18	0.5 UJ	0.5 UJ	MA-MW-1S-R1	0.250	0.00
	Trichloroethylene	79-01-6	8 / 18	2 / 18	0.92	8.1	MA-MW-14S-R1	1.293	1.96
	Trichlorofluoromethane	75-69-4	0 / 18	4 / 18	0.5 UJ	0.5 UJ	MA-MW-1S-R1	0.250	0.00
	Vinyl chloride	75-01-4	4 / 18	3 / 18	3 J	58 J	MA-MW-12S-R1	7.657	18.53
	Xylenes, total	1330-20-7	5 / 18	7 / 18	0.77 J	90 J	MA-MW-5S-R1	14.806	30.07
Total Inorganics (ug/L)	Aluminum	7429-90-5	15 / 18	0 / 18	210	36000	MA-MW-22S-R1	3657.778	8986.60

TABLE 11
Summary Statistics for Ground Water - Shallow Monitoring Wells from Round 1 (June 2002)
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No	Frequency of Detection	Frequency of Rejected ^a	Minimum Value	Maximum		Mean	
						Value	Max SampleID	Value	St Dev
	Antimony	7440-36-0	1 / 18	0 / 18	19	19	MA-MW-1S-R1	7.667	2.83
	Arsenic	7440-38-2	13 / 18	0 / 18	9.2	6400	MA-MW-13S-R1	797.767	1698.87
	Barium	7440-39-3	18 / 18	0 / 18	37	26000	MA-MW-13S-R1	2047.222	6101.32
	Beryllium	7440-41-7	0 / 18	0 / 18	5 U	5 U	MA-MW-1S-R1	2.500	0.00
	Cadmium	7440-43-9	1 / 18	0 / 18	14	14	MA-MW-17S-R1	2.667	2.83
	Calcium	7440-70-2	18 / 18	0 / 18	40	890	MA-MW-13S-R1	135.889	190.93
	Chromium	7440-47-3	10 / 18	0 / 18	8.2	110	MA-MW-22S-R1	17.367	26.73
	Cobalt	7440-48-4	6 / 18	0 / 18	8.4	32	MA-MW-15S-R1	8.633	8.55
	Copper	7440-50-8	7 / 18	0 / 18	12	140	MA-MW-22S-R1	16.667	31.52
	Cyanide	57-12-5	0 / 18	3 / 18	0.6 U**	1.8 B**	MA-MW-4S-R1	0.470	0.23
	Iron	7439-89-6	18 / 18	0 / 18	300	70000	MA-MW-13S-R1	18172.222	21620.87
	Lead	7439-92-1	2 / 18	0 / 18	51	630	MA-MW-22S-R1	40.944	147.43
	Magnesium	7439-95-4	18 / 18	0 / 18	12	240	MA-MW-5S-R1	61.944	70.69
	Manganese	7439-96-5	18 / 18	0 / 18	32	1700	MA-MW-15S-R1	508.889	488.26
	Mercury	7439-97-6	3 / 18	0 / 18	0.08	0.18	MA-MW-22S-R1	0.071	0.08
	Nickel	7440-02-0	11 / 18	0 / 18	8.7	61	MA-MW-22S-R1	15.067	16.19
	Potassium	7440-09-7	18 / 18	0 / 18	4.8	53	MA-MW-13S-R1	16.456	11.53
	Selenium	7782-49-2	3 / 18	0 / 18	12	17	MA-MW-20S-R1	5.250	4.13
	Silver	7440-22-4	0 / 18	0 / 18	6 U	6 U	MA-MW-1S-R1	3.000	0.00
	Sodium	7440-23-5	18 / 18	0 / 18	4.5	150	MA-MW-5S-R1	59.917	36.84
	Thallium	7440-28-0	0 / 18	0 / 18	20 U	20 U	MA-MW-1S-R1	10.000	0.00
	Vanadium	7440-62-2	4 / 18	0 / 18	14	87	MA-MW-22S-R1	13.278	20.73
	Zinc	7440-66-6	15 / 18	0 / 18	9.5	2900	MA-MW-17S-R1	401.972	747.35
Dissolved Inorganics (ug/kg)	Aluminum	7429-90-5	0 / 18	0 / 18	200 U	200 U	MA-MW-1S-R1	100.000	0.00
	Antimony	7440-36-0	0 / 18	0 / 18	14 U	14 U	MA-MW-1S-R1	7.000	0.00
	Arsenic	7440-38-2	10 / 18	0 / 18	17	4700	MA-MW-1S-R1	665.889	1224.20
	Barium	7440-39-3	18 / 18	0 / 18	38	5200	MA-MW-18S-R1	581.667	1190.05
	Beryllium	7440-41-7	0 / 18	0 / 18	5 U	5 U	MA-MW-1S-R1	2.500	0.00
	Cadmium	7440-43-9	2 / 18	0 / 18	4.3	14	MA-MW-17S-R1	2.794	2.85
	Calcium	7440-70-2	18 / 18	0 / 18	41	94000	MA-MW-12S-R1	5338.389	22127.18
	Chromium	7440-47-3	6 / 18	0 / 18	6	18	MA-MW-5S-R1	5.283	4.06
	Cobalt	7440-48-4	2 / 18	0 / 18	10	10	MA-MW-9S-R1	4.667	1.94
	Copper	7440-50-8	1 / 18	0 / 18	11	11	MA-MW-17S-R1	5.333	1.41
	Iron	7439-89-6	14 / 18	0 / 18	470	28000	MA-MW-18S-R1	7366.667	8737.52
	Lead	7439-92-1	0 / 18	0 / 18	7 U	7 U	MA-MW-1S-R1	3.500	0.00
	Magnesium	7439-95-4	18 / 18	0 / 18	12	76000	MA-MW-12S-R1	4280.278	17898.99
	Manganese	7439-96-5	18 / 18	0 / 18	11	1600	MA-MW-18S-R1	399.611	385.20
	Mercury	7439-97-6	0 / 18	0 / 18	0.05 U	0.06 U	MA-MW-1S-R1	0.027	0.00
	Nickel	7440-02-0	7 / 18	0 / 18	6.2	30	MA-MW-13S-R1	7.483	8.45
	Potassium	7440-09-7	18 / 18	0 / 18	4.5	17000	MA-MW-12S-R1	961.722	4002.65
	Selenium	7782-49-2	18 / 18	0 / 18	12 J	40	MA-MW-15S-R1	22.556	9.01
	Silver	7440-22-4	0 / 18	0 / 18	6 U	6 U	MA-MW-1S-R1	3.000	0.00
	Sodium	7440-23-5	18 / 18	0 / 18	4.9	75000	MA-MW-12S-R1	4224.328	17663.32
	Thallium	7440-28-0	0 / 18	0 / 18	20 U	20 U	MA-MW-1S-R1	10.000	0.00
	Vanadium	7440-62-2	1 / 18	0 / 18	15	15	MA-MW-13S-R1	5.556	2.36
	Zinc	7440-66-6	11 / 18	0 / 18	10	2900	MA-MW-17S-R1	284.222	729.87

Notes

^anumber of samples, out of the total samples from FOD, for which data were rejected

TABLE 12
Summary Statistics for Ground Water - Shallow Monitoring Wells from Round 2 (September 2002)
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No.	Frequency of	Frequency of	Minimum Value	Maximum	Mean	
			Detection	Rejected*		Value	Max SampleID	Value St Dev
SVOCs (ug/L)	Acenaphthene	83-32-9	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Acenaphthylene	208-96-8	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Acetophenone	98-86-2	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Anthracene	120-12-7	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Atrazine	1912-24-9	0 / 16	0 / 16	5 UJ	5 UJ	MA-MW-1S-R2	2.500 0.00
	Benzaldehyde	100-52-7	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Benzo(a)anthracene	56-55-3	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Benzo(a)pyrene	50-32-8	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Benzo(b)fluoranthene	205-99-2	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Benzo(g,h,i)perylene	191-24-2	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Benzo(k)fluoranthene	207-08-9	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Biphenyl	92-52-4	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Bromophenyl-4 Phenyl Ether	101-55-3	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Butylbenzyl phthalate	85-68-7	1 / 16	0 / 16	1.3 J	1.3 J	MA-MW-14S-R2	2.425 0.30
	Caprolactam	105-60-2	2 / 16	0 / 16	2.1 J	3.2 J	MA-MW-22S-R2	2.519 0.21
	Chloroaniline-4	106-47-8	0 / 16	1 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Chloronaphthalene-2	91-58-7	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Chlorophenol-2	95-57-8	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Chlorophenyl-4 phenyl ether	7005-72-3	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Chrysene	218-01-9	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Cresol-4,6-dinitro-ortho	534-52-1	0 / 16	0 / 16	20 UJ	20 UJ	MA-MW-1S-R2	10.000 0.00
	Cresol-o	95-48-7	1 / 16	0 / 16	1.4 J	1.4 J	MA-MW-16S-R2	2.431 0.28
	Cresol-p	106-44-5	2 / 16	0 / 16	1.3 J	2.2 J	MA-MW-1S-R2	2.406 0.30
	Cresol-parachloro-meta	59-50-7	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Dibenzo(a,h)anthracene	53-70-3	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Dibenzofuran	132-64-9	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Dichlorobenzidine-3,3	91-94-1	0 / 16	10 / 16	5 UJ	5 UJ	MA-MW-1S-R2	2.500 0.00
	Dichlorophenol-2,4	120-83-2	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Dimethylphenol-2,4	105-67-9	1 / 16	0 / 16	1.2 J	1.2 J	MA-MW-16S-R2	2.419 0.32
	Dinitrophenol-2,4	51-28-5	0 / 16	0 / 16	20 U	20 U	MA-MW-1S-R2	10.000 0.00
	Dinitrotoluene-2,4	121-14-2	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Dinitrotoluene-2,6	606-20-2	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Ether, bis(2-chloroethyl)	111-44-4	2 / 16	0 / 16	2.6 J	15	MA-MW-9S-R2	3.288 3.12
	Ether, bis-chloroisopropyl	108-60-1	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Fluoranthene	206-44-0	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Fluorene	86-73-7	1 / 16	0 / 16	1.1 J	1.1 J	MA-MW-5S-R2	2.413 0.35
	Hexachlorobenzene	118-74-1	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Hexachlorobutadiene	87-68-3	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Hexachlorocyclopentadiene	77-47-4	0 / 16	1 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Hexachloroethane	67-72-1	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Indeno(1,2,3-cd)pyrene	193-39-5	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Isophorone	78-59-1	1 / 16	0 / 16	3.2 J	3.2 J	MA-MW-9S-R2	2.544 0.17
	Methane, bis(2-chloroethoxy)	111-91-1	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00
	Methylnaphthalene-2	91-57-6	2 / 16	0 / 16	1.9 J	4 J	MA-MW-5S-R2	2.556 0.41
	Naphthalene	91-20-3	3 / 16	0 / 16	1.6 J	170	MA-MW-16S-R2	17.694 44.88
	Nitroaniline-2	88-74-4	0 / 16	0 / 16	20 U	20 U	MA-MW-1S-R2	10.000 0.00
	Nitroaniline-3	99-09-2	0 / 16	0 / 16	20 U	20 U	MA-MW-1S-R2	10.000 0.00
	Nitroaniline-4	100-01-6	0 / 16	0 / 16	20 U	20 U	MA-MW-1S-R2	10.000 0.00
	Nitrobenzene	98-95-3	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500 0.00

TABLE 12
Summary Statistics for Ground Water - Shallow Monitoring Wells from Round 2 (September 2002)
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No	Frequency of Detection	Frequency of Rejected ^a	Minimum Value	Maximum		Mean	
						Value	Max SampleID	Value	St Dev
Organic Compounds	Nitrophenol-2	88-75-5	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500	0.00
	Nitrophenol-4	100-02-7	0 / 16	0 / 16	20 U	20 U	MA-MW-1S-R2	10.000	0.00
	Nitroso-di-n-propyl-amine-N	621-64-7	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500	0.00
	Nitrosodiphenylamine-n	86-30-6	3 / 16	0 / 16	4.9 J	38	MA-MW-1S-R2	5.050	8.83
	PCP (Pentachlorophenol)	87-66-5	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500	0.00
	Phenanthrene	85-01-8	1 / 16	0 / 16	2.2 J	2.2 J	MA-MW-5S-R2	2.481	0.07
	Phenol	108-95-2	1 / 16	0 / 16	2.4 J	2.4 J	MA-MW-5S-R2	2.494	0.02
	Phthalate, bis(2-ethylhexyl) (DEHP)	117-81-7	3 / 16	0 / 16	1.4 J	2.6 J	MA-MW-9S-R2	2.369	0.38
	Phthalate, di-n-butyl	84-74-2	2 / 16	0 / 16	1.2 J	1.3 J	MA-MW-14S-R2	2.344	0.43
	Phthalate, di-n-octyl	117-84-0	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500	0.00
	Phthalate, diethyl	84-66-2	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500	0.00
	Phthalate, dimethyl	131-11-3	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500	0.00
	Pyrene	129-00-0	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500	0.00
	Tetrachlorobenzene-1,2,4,5	95-94-3	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500	0.00
	Trichlorophenol-2,4,5	95-95-4	0 / 16	0 / 16	20 U	20 U	MA-MW-1S-R2	10.000	0.00
	Trichlorophenol-2,4,6	88-06-2	0 / 16	0 / 16	5 U	5 U	MA-MW-1S-R2	2.500	0.00
Pesticides/PCBs (ug/L)	Aldrin	309-00-2	0 / 18	1 / 18	0.01 U	0.01 U	MA-MW-1S-R2	0.005	0.00
	BHC, alpha	319-84-6	0 / 18	1 / 18	0.01 U	0.01 U	MA-MW-1S-R2	0.005	0.00
	BHC, beta	319-85-7	0 / 18	1 / 18	0.01 U	0.01 U	MA-MW-1S-R2	0.005	0.00
	BHC, delta	319-86-8	0 / 18	1 / 18	0.01 U	0.01 U	MA-MW-1S-R2	0.005	0.00
	BHC, gamma (Lindane)	58-89-9	0 / 18	1 / 18	0.01 U	0.01 U	MA-MW-1S-R2	0.005	0.00
	Chlordane - alpha	5103-71-9	0 / 18	0 / 18	0.01 U	0.01 U	MA-MW-1S-R2	0.005	0.00
	Chlordane - gamma (technical mixture)	12789-03-6	0 / 18	0 / 18	0.01 U	0.01 U	MA-MW-1S-R2	0.005	0.00
	DDD-4,4	72-54-8	0 / 18	0 / 18	0.02 U	0.02 U	MA-MW-1S-R2	0.010	0.00
	DDE-4,4	72-55-9	0 / 18	0 / 18	0.02 U	0.02 U	MA-MW-1S-R2	0.010	0.00
	DDT-4,4	50-29-3	0 / 18	0 / 18	0.02 U	0.02 U	MA-MW-1S-R2	0.010	0.00
	Dieldrin	60-57-1	1 / 18	0 / 18	0.064 NJ	0.064 NJ	MA-MW-14S-R2	0.013	0.01
	Endosulfan I (alpha)	959-98-8	0 / 18	0 / 18	0.01 U	0.01 U	MA-MW-1S-R2	0.005	0.00
	Endosulfan II (beta)	33213-65-9	0 / 18	0 / 18	0.02 U	0.02 U	MA-MW-1S-R2	0.010	0.00
	Endosulfan Sulfate	1031-07-8	0 / 18	0 / 18	0.02 U	0.02 U	MA-MW-1S-R2	0.010	0.00
	Endrin	72-20-8	0 / 18	0 / 18	0.02 U	0.02 U	MA-MW-1S-R2	0.010	0.00
	Endrin Aldehyde	7421-93-4	0 / 18	0 / 18	0.02 U	0.02 U	MA-MW-1S-R2	0.010	0.00
	Endrin ketone	53494-70-5	0 / 18	0 / 18	0.02 U	0.02 U	MA-MW-1S-R2	0.010	0.00
	Heptachlor	76-44-8	0 / 18	1 / 18	0.01 U	0.01 U	MA-MW-1S-R2	0.005	0.00
	Heptachlor Epoxide	1024-57-3	0 / 18	0 / 18	0.01 U	0.01 U	MA-MW-1S-R2	0.005	0.00
	Methoxychlor	72-43-5	0 / 18	0 / 18	0.1 U	0.1 U	MA-MW-1S-R2	0.050	0.00
	Pcb-Aroclor 1016	12674-11-2	0 / 18	0 / 18	0.2 U	0.2 U	MA-MW-1S-R2	0.100	0.00
	Pcb-Aroclor 1221	11104-28-2	0 / 18	0 / 18	0.4 U	0.4 U	MA-MW-1S-R2	0.200	0.00
	Pcb-Aroclor 1232	11141-16-5	0 / 18	0 / 18	0.2 U	0.2 U	MA-MW-1S-R2	0.100	0.00
	Pcb-Aroclor 1242	53469-21-9	0 / 18	0 / 18	0.2 U	0.2 U	MA-MW-1S-R2	0.100	0.00
	Pcb-Aroclor 1248	12672-29-6	0 / 18	0 / 18	0.2 U	0.2 U	MA-MW-1S-R2	0.100	0.00
	Pcb-Aroclor 1254	11097-69-1	0 / 18	0 / 18	0.2 U	0.2 U	MA-MW-1S-R2	0.100	0.00
	Pcb-Aroclor 1260	11096-82-5	0 / 18	0 / 18	0.2 U	0.2 U	MA-MW-1S-R2	0.100	0.00
	Toxaphene	8001-35-2	0 / 18	0 / 18	1 U	1 U	MA-MW-1S-R2	0.500	0.00
VOCs (ug/L)	Acetone	67-64-1	2 / 18	0 / 18	20 J	44 J	MA-MW-13S-R2	8.500	14.63
	Benzene	71-43-2	10 / 18	0 / 18	0.22 J	110	MA-MW-5S-R2	10.487	27.16
	Bromoform	75-25-2	4 / 18	1 / 18	0.27 J	0.93 J	MA-MW-21S-R2	0.604	1.15
	Bromomethane	74-83-9	1 / 18	3 / 18	0.15 J	0.15 J	MA-MW-22S-R2	0.560	1.23
	Carbon disulfide	75-15-0	5 / 18	1 / 18	0.23 J	0.6	MA-MW-15S-R2	0.562	1.15

TABLE 12
Summary Statistics for Ground Water - Shallow Monitoring Wells from Round 2 (September 2002)
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No	Frequency of Detection	Frequency of Rejected ^a	Minimum Value	Maximum		Mean	
						Value	Max SampleID	Value	St Dev
	Carbon tetrachloride	56-23-5	0 / 18	1 / 18	.5 U	10 U	MA-MW-5S-R2	0.529	1.15
	Chlorobenzene	108-90-7	4 / 18	1 / 18	0.44 J	1.3	MA-MW-15S-R2	0.638	1.15
	Chlorobromomethane	74-97-5	0 / 18	1 / 18	0.5 U	10 U	MA-MW-5S-R2	0.529	1.15
	Chloroethane	75-00-3	1 / 18	3 / 18	3	3	MA-MW-15S-R2	0.750	1.37
	Chloroform	67-66-3	2 / 18	1 / 18	0.21 J	1.3 J	MA-MW-22S-R2	0.589	1.16
	Chloromethane	74-87-3	0 / 18	3 / 18	0.5 U	10 U	MA-MW-5S-R2	0.567	1.23
	Cyclohexane	110-82-7	7 / 18	1 / 18	0.19 J	28	MA-MW-5S-R2	2.524	6.89
	DBCP (1,2-dibromo-3-chloropropane)	96-12-8	0 / 18	1 / 18	0.5 U	10 U	MA-MW-5S-R2	0.529	1.15
	Dibromochloromethane	124-48-1	0 / 18	1 / 18	0.5 U	10 U	MA-MW-5S-R2	0.529	1.15
	Dibromoethane-1,2	106-93-4	0 / 18	1 / 18	0.5 U	10 U	MA-MW-5S-R2	0.529	1.15
	Dichlorobenzene-1,2	95-50-1	5 / 18	1 / 18	0.25 J	6	MA-MW-12S-R2	1.117	1.81
	Dichlorobenzene-1,3	541-73-1	2 / 18	1 / 18	0.34 J	0.66	MA-MW-12S-R2	0.559	1.15
	Dichlorobenzene-1,4	106-46-7	5 / 18	0 / 18	0.16 J	1.5	MA-MW-12S-R2	0.576	1.14
	Dichlorobromomethane	75-27-4	0 / 18	1 / 18	0.5 U	10 U	MA-MW-5S-R2	0.529	1.15
	Dichlorodifluoromethane	75-71-8	0 / 18	3 / 18	0.5 U	10 U	MA-MW-5S-R2	0.567	1.23
	Dichloroethane-1,1	75-34-3	9 / 18	1 / 18	0.15 J	41	MA-MW-16S-R2	4.255	9.91
	Dichloroethane-1,2	107-06-2	2 / 18	1 / 18	0.23 J	3.5	MA-MW-16S-R2	0.719	1.36
	Dichloroethylene-1,2 trans	156-60-5	5 / 18	1 / 18	0.18 J	21	MA-MW-14S-R2	2.461	5.41
	Dichloroethylene-1,1	75-35-4	3 / 18	1 / 18	0.41 J	0.54	MA-MW-14S-R2	0.569	1.15
	Dichloroethylene-1,2 cis	156-59-2	12 / 18	1 / 18	0.25 J	380	MA-MW-14S-R2	35.711	98.67
	Dichloropropane-1,2	78-87-5	1 / 18	1 / 18	0.64	0.64	MA-MW-9S-R2	0.552	1.15
	Dichloropropene-1,3 cis	10061-01-5	1 / 18	1 / 18	0.21 J	0.21 J	MA-MW-18S-R2	0.527	1.15
	Dichloropropene-1,3 trans	10061-02-6	0 / 18	1 / 18	0.5 U	10 U	MA-MW-5S-R2	0.529	1.15
	Ethylbenzene	100-41-4	8 / 18	0 / 18	0.16 J	26	MA-MW-5S-R2	1.964	6.03
	Freon 113 (1,1,2-trichloro-1,2,2-trifluoroethane)	76-13-1	0 / 18	1 / 18	0.5 U	10 U	MA-MW-5S-R2	0.529	1.15
	Hexanone-2	591-78-6	1 / 18	1 / 18	0.24 J	0.24 J	MA-MW-1S-R2	5.161	11.57
	Isopropylbenzene	98-82-8	5 / 18	1 / 18	0.26 J	5.8 J	MA-MW-5S-R2	0.921	1.58
	Methyl acetate	79-20-9	1 / 18	1 / 18	0.29 J	0.29 J	MA-MW-10S-R2	0.532	1.15
	Methyl cyclohexane	108-87-2	5 / 18	1 / 18	0.59 J	180	MA-MW-5S-R2	11.623	43.47
	Methyl ethyl ketone (2-butanonone)	78-93-3	4 / 18	0 / 18	1 J	7.2 J	MA-MW-13S-R2	5.264	11.25
	Methyl isobutyl ketone (4-methyl-2-pentanone)	108-10-1	1 / 18	0 / 18	6.2 J	6.2 J	MA-MW-13S-R2	5.344	11.18
	Methyl tertiary butyl ether (MTBE)	1634-04-4	11 / 18	1 / 18	0.32 J	5.6	MA-MW-1S-R2	1.924	2.11
	Methylene chloride	75-09-2	0 / 18	0 / 18	0.5 U	10 U	MA-MW-5S-R2	0.514	1.12
	Styrene	100-42-5	0 / 18	1 / 18	0.5 U	10 U	MA-MW-5S-R2	0.529	1.15
	Tetrachloroethane-1,1,2,2	79-34-5	0 / 18	1 / 18	0.5 U	10 U	MA-MW-5S-R2	0.529	1.15
	Tetrachloroethylene	127-18-4	4 / 18	1 / 18	0.2 J	1.5	MA-MW-9S-R2	0.607	1.17
	Toluene	108-88-3	9 / 18	0 / 18	0.17 J	5.9	MA-MW-8S-R2	1.409	1.93
	Trichlorobenzene-1,2,3	87-61-6	2 / 18	1 / 18	0.29 J	0.71	MA-MW-14S-R2	0.559	1.15
	Trichlorobenzene-1,2,4	120-82-1	2 / 18	1 / 18	2	2.2	MA-MW-12S-R2	0.747	1.26
	Trichloroethane-1,1,1	71-55-6	4 / 18	1 / 18	0.35 J	60	MA-MW-20S-R2	5.124	14.80
	Trichloroethane-1,1,2	79-00-5	1 / 18	1 / 18	0.25 J	0.25 J	MA-MW-9S-R2	0.529	1.15
	Trichloroethylene	79-01-6	8 / 18	1 / 18	0.17 J	11	MA-MW-14S-R2	1.755	2.89
	Trichlorofluoromethane	75-69-4	0 / 18	1 / 18	0.5 U	10 U	MA-MW-5S-R2	0.529	1.15
	Vinyl chloride	75-01-4	7 / 18	1 / 18	0.63	17 J	MA-MW-14S-R2	2.663	4.58
	Xylenes, total	1330-20-7	5 / 18	1 / 18	1.1	17	MA-MW-5S-R2	2.069	4.52
Total Inorganics (ug/L)	Aluminum	7429-90-5	11 / 18	0 / 18	206	33300	MA-MW-20S-R2	3287.281	8052.22
	Antimony	7440-36-0	0 / 18	0 / 18	1.6 U	18.7 BJ	MA-MW-1S-R2	1.525	2.04
	Arsenic	7440-38-2	12 / 18	1 / 18	12.6	7130 J	MA-MW-1S-R2	768.900	1755.38
	Barium	7440-39-3	12 / 18	0 / 18	212	36500	MA-MW-13S-R2	2762.608	8546.93

303156

TABLE 12
Summary Statistics for Ground Water - Shallow Monitoring Wells from Round 2 (September 2002)
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No	Frequency of Detection	Frequency of Rejected ^a	Minimum Value	Maximum		Mean	
						Value	Max SampleID	Value	St Dev
Dissolved Inorganics (ug/L)	Beryllium	7440-41-7	0 / 18	0 / 18	0.2 U	2.6 B	MA-MW-20S-R2	0.199	0.29
	Cadmium	7440-43-9	3 / 18	0 / 18	6.8	45.7	MA-MW-10S-R2	3.863	10.90
	Calcium	7440-70-2	18 / 18	0 / 18	43300	953000	MA-MW-13S-R2	151461.111	203193.56
	Chromium	7440-47-3	8 / 18	0 / 18	18.2	84	MA-MW-20S-R2	21.039	26.48
	Cobalt	7440-48-4	0 / 18	0 / 18	0.4 U	20.4 B	MA-MW-20S-R2	2.012	2.63
	Copper	7440-50-8	3 / 18	0 / 18	34.7	41.3	MA-MW-20S-R2	9.869	13.64
	Cyanide	57-12-5	6 / 17	0 / 17	10	38.2	MA-MW-19S-R2	7.518	9.69
	Iron	7439-89-6	18 / 18	0 / 18	532	51900	MA-MW-20S-R2	12380.278	13679.95
	Lead	7439-92-1	13 / 18	0 / 18	3.7	192	MA-MW-15S-R2	20.186	44.43
	Magnesium	7439-95-4	18 / 18	0 / 18	12700	266000	MA-MW-5S-R2	77027.778	81850.31
	Manganese	7439-96-5	17 / 18	0 / 18	23.1	1350	MA-MW-18S-R2	391.686	322.85
	Mercury	7439-97-6	1 / 18	0 / 18	0.8	0.8	MA-MW-13S-R2	0.095	0.18
	Nickel	7440-02-0	1 / 18	0 / 18	59	59	MA-MW-20S-R2	8.972	13.33
	Potassium	7440-09-7	17 / 18	0 / 18	7180 J	119000 J	MA-MW-13S-R2	22285.000	26060.13
	Selenium	7782-49-2	4 / 18	0 / 18	7 J	18.8 J	MA-MW-20S-R2	3.819	4.88
	Silver	7440-22-4	0 / 18	0 / 18	0.7 U	0.7 U	MA-MW-1S-R2	0.350	0.00
	Sodium	7440-23-5	18 / 18	0 / 18	7610	167000	MA-MW-5S-R2	65945.000	42456.22
	Thallium	7440-28-0	0 / 18	0 / 18	2.6 U	2.6 U	MA-MW-1S-R2	1.300	0.00
	Vanadium	7440-62-2	1 / 18	0 / 18	67.2	67.2	MA-MW-20S-R2	7.953	15.72
	Zinc	7440-66-6	12 / 18	0 / 18	50.8	2100	MA-MW-17S-R2	383.322	572.16
Dissolved Inorganics (ug/L)	Aluminum	7429-90-5	0 / 18	0 / 18	57.7 U	110 B	MA-MW-13S-R2	31.000	6.68
	Antimony	7440-36-0	0 / 18	0 / 18	1.6 U	23.7 B	MA-MW-13S-R2	1.600	2.60
	Arsenic	7440-38-2	11 / 18	1 / 18	10.3	3700	MA-MW-1S-R2	512.721	987.89
	Barium	7440-39-3	10 / 18	0 / 18	215	5740	MA-MW-18S-R2	-818.297	1489.23
	Beryllium	7440-41-7	0 / 18	0 / 18	0.2 U	0.36 B	MA-MW-5S-R2	0.105	0.02
	Cadmium	7440-43-9	2 / 18	0 / 18	11.1	12.7	MA-MW-17S-R2	1.614	3.80
	Calcium	7440-70-2	18 / 18	0 / 18	43200	976000	MA-MW-13S-R2	148933.333	210034.18
	Chromium	7440-47-3	4 / 18	0 / 18	11.8	19.4	MA-MW-5S-R2	4.558	5.75
	Cobalt	7440-48-4	0 / 18	0 / 18	0.4 U	7.2 B	MA-MW-9S-R2	0.716	0.83
	Copper	7440-50-8	0 / 18	0 / 18	0.6 U	16.6 B	MA-MW-9S-R2	1.253	1.98
	Iron	7439-89-6	15 / 18	0 / 18	235	25400	MA-MW-18S-R2	5914.581	7930.75
	Lead	7439-92-1	0 / 18	0 / 18	0.7 U	2.4 B	MA-MW-22S-R2	0.397	0.20
	Magnesium	7439-95-4	18 / 18	0 / 18	12600	270000	MA-MW-5S-R2	74094.444	84844.37
	Manganese	7439-96-5	15 / 18	0 / 18	17	1350	MA-MW-18S-R2	364.858	353.70
	Mercury	7439-97-6	1 / 18	0 / 18	0.37	0.37	MA-MW-13S-R2	0.068	0.08
	Nickel	7440-02-0	0 / 18	0 / 18	1.3 B	29.5 B	MA-MW-9S-R2	3.781	4.14
	Potassium	7440-09-7	17 / 18	0 / 18	5780 J	176000 J	MA-MW-13S-R2	25041.389	39041.32
	Selenium	7782-49-2	3 / 18	0 / 18	11.6	17.3	MA-MW-20S-R2	3.550	4.81
	Silver	7440-22-4	0 / 18	0 / 18	0.7 U	0.7 U	MA-MW-1S-R2	0.350	0.00
	Sodium	7440-23-5	18 / 18	0 / 18	7470	184000 J	MA-MW-13S-R2	67531.667	47954.96
	Thallium	7440-28-0	0 / 18	0 / 18	2.6 U	5.3 B	MA-MW-18S-R2	1.403	0.32
	Vanadium	7440-62-2	0 / 18	0 / 18	0.4 U	39.5 B	MA-MW-13S-R2	2.006	4.49
	Zinc	7440-66-6	5 / 18	0 / 18	20.9 J	2190	MA-MW-17S-R2	228.172	576.67

Notes

^anumber of samples, out of the total samples from FOD, for which data were rejected

TABLE 13
Soil Bioconcentration Factors for Plants and Soil Invertebrates
Martin Aaron Site, Camden, NJ

Chemical	Soil-Plant BCF (dry weight)		Soil-Invertebrate BAF (dry weight)	
	Value	Reference	Value	Reference
Inorganics				
Antimony	0.2	Baes et al. 1984	1	--
Arsenic	1.103	Bechtel Jacobs 1998a	0.523	Sample et al. 1998a
Barium	0.15	Baes et al. 1984	0.36	Beyer and Stafford 1993
Cadmium	3.25	Bechtel Jacobs 1998a	40.69	Sample et al. 1998a
Chromium	0.0075	Baes et al. 1984	3.162	Sample et al. 1998a
Cobalt	0.02	Baes et al. 1984	1	--
Copper	0.625	Bechtel Jacobs 1998a	1.531	Sample et al. 1998a
Iron	0.004	Baes et al. 1984	0.1	Sample et al. 1998a
Lead	0.468	Bechtel Jacobs 1998a	1.522	Sample et al. 1998a
Manganese	0.25	Baes et al. 1984	0.124	Sample et al. 1998a
Mercury	5	Bechtel Jacobs 1998a	20.63	Sample et al. 1998a
Nickel	1.411	Bechtel Jacobs 1998a	4.73	Sample et al. 1998a
Selenium	3.012	Bechtel Jacobs 1998a	1.34	Sample et al. 1998a
Silver	0.4	Baes et al. 1984	1	--
Thallium	0.004	Baes et al. 1984	1	--
Vanadium	0.0055	Baes et al. 1984	0.088	Sample et al. 1998a
Zinc	1.82	Bechtel Jacobs 1998a	12.89	Sample et al. 1998a
Pesticides/PCBs				
4,4'-DDE	0.0048	Travis and Arms 1988	10.6	Menzie et al. 1992
4,4'-DDT	0.0065	Travis and Arms 1988	0.7	Menzie et al. 1992
Aldrin	0.0068	Travis and Arms 1988	1	--
alpha-Chlordane	0.0086	Travis and Arms 1988	3	Menzie et al. 1992
Aroclor-1016	0.0224	Travis and Arms 1988	15.91	Sample et al. 1998a
Aroclor-1221	0.0744	Travis and Arms 1988	15.91	Sample et al. 1998a
Aroclor-1232	0.0437	Travis and Arms 1988	15.91	Sample et al. 1998a
Aroclor-1242	0.0224	Travis and Arms 1988	15.91	Sample et al. 1998a
Aroclor-1248	0.0101	Travis and Arms 1988	15.91	Sample et al. 1998a
Aroclor-1254	0.0068	Travis and Arms 1988	15.91	Sample et al. 1998a
Aroclor-1260	0.0045	Travis and Arms 1988	15.91	Sample et al. 1998a
Dieldrin	0.0305	Travis and Arms 1988	8	Beyer and Gish 1980
Endosulfan I	0.2367	Travis and Arms 1988	1	--
Endosulfan II	0.0945	Travis and Arms 1988	1	--
Endosulfan Sulfate	0.2814	Travis and Arms 1988	1	--
Endrin	0.0461	Travis and Arms 1988	1	--
Endrin Ketone	0.1888	Travis and Arms 1988	1	--
Gamma-Chlordane	0.0086	Travis and Arms 1988	3	Menzie et al. 1992

TABLE 13
Soil Bioconcentration Factors for Plants and Soil Invertebrates
Martin Aaron Site, Camden, NJ

Chemical	Soil-Plant BCF (dry weight)		Soil-Invertebrate BAF (dry weight)	
	Value	Reference	Value	Reference
Heptachlor	0.0093	Travis and Arms 1988	10	Roberts and Dorough 1985
Methoxychlor	0.0448	Travis and Arms 1988	1	--
Toxaphene	0.0256	Travis and Arms 1988	1	--
Semivolatile Organic Compounds				
1,2-Dichlorobenzene	0.4031	Travis and Arms 1988	1	--
1,3-Dichlorobenzene	0.3673	Travis and Arms 1988	1	--
2,4,5-Trichlorophenol	0.2157	Travis and Arms 1988	8.4	van Gestel and Ma 1988
2,4,6-Trichlorophenol	0.2814	Travis and Arms 1988	1	--
2,4-Dichlorophenol	0.6423	Travis and Arms 1988	1	--
2,4-Dimethylphenol*	1.6746	Travis and Arms 1988	1	--
2,4-Dinitrophenol*	4.9215	Travis and Arms 1988	1	--
2,4-Dinitrotoluene*	2.6682	Travis and Arms 1988	1	--
2,6-Dinitrotoluene*	3.2147	Travis and Arms 1988	1	--
2-Chloronaphthalene	0.1653	Travis and Arms 1988	1	--
2-Chlorophenol*	2.2146	Travis and Arms 1988	1	--
2-Methylnaphthalene	0.2157	Travis and Arms 1988	0.2	Beyer and Stafford 1993
2-Nitroaniline*	3.0889	Travis and Arms 1988	1	--
2-Nitrophenol*	3.5286	Travis and Arms 1988	1	--
3,3'-Dichlorobenzidine	0.3624	Travis and Arms 1988	1	--
3-Nitroaniline*	6.009	Travis and Arms 1988	1	--
4-Bromophenyl-Phenylether	0.0499	Travis and Arms 1988	1	--
4-Chloroaniline*	3.3014	Travis and Arms 1988	1	--
4-Chlorophenyl-Phenylether	0.0533	Travis and Arms 1988	1	--
4-Nitroaniline*	6.009	Travis and Arms 1988	1	--
4-Nitrophenol*	3.0889	Travis and Arms 1988	1	--
Acenaphthene	0.21	Travis and Arms 1988	0.3	Beyer and Stafford 1993
Acenaphthylene	0.1653	Travis and Arms 1988	0.22	Beyer and Stafford 1993
Anthracene	0.0908	Travis and Arms 1988	0.32	Beyer and Stafford 1993
Benzo(a)anthracene	0.0197	Travis and Arms 1988	0.27	Beyer and Stafford 1993
Benzo(a)pyrene	0.0114	Travis and Arms 1988	0.34	Beyer and Stafford 1993
Benzo(b)fluoranthene	0.0101	Travis and Arms 1988	0.21	Beyer and Stafford 1993
Benzo(g,h,i)perylene	0.0052	Travis and Arms 1988	0.15	Beyer and Stafford 1993
Benzo(k)fluoranthene	0.0101	Travis and Arms 1988	0.21	Beyer and Stafford 1993
Bis(2-Chloroethoxy)methane*	14.2725	Travis and Arms 1988	1	--
Bis(2-Chloroethyl)ether*	7.7378	Travis and Arms 1988	1	--
Bis(2-Ethylhexyl)phthalate	0.0023	Travis and Arms 1988	1	--
Butylbenzylphthalate	0.0617	Travis and Arms 1988	1	--

303159

TABLE 13
Soil Bioconcentration Factors for Plants and Soil Invertebrates
Martin Aaron Site, Camden, NJ

Chemical	Soil-Plant BCF (dry weight)		Soil-Invertebrate BAF (dry weight)	
	Value	Reference	Value	Reference
Carbazole	0.3258	Travis and Arms 1988	1	--
Chrysene	0.0197	Travis and Arms 1988	0.44	Beyer and Stafford 1993
Dibenz(a,h)anthracene	0.0053	Travis and Arms 1988	0.49	Beyer and Stafford 1993
Dibenzofuran	0.1447	Travis and Arms 1988	1	--
Dimethylphthalate*	4.7923	Travis and Arms 1988	1	--
Di-n-octylphthalate	0.0008	Travis and Arms 1988	1	--
Fluoranthene	0.0425	Travis and Arms 1988	0.37	Beyer and Stafford 1993
Fluorene	0.1428	Travis and Arms 1988	0.2	Beyer and Stafford 1993
Hexachlorobutadiene	0.0642	Travis and Arms 1988	1	--
Hexachlorobenzene	0.0153	Travis and Arms 1988	1.69	Beyer 1996
Hexachlorocyclopentadiene	0.0297	Travis and Arms 1988	1	--
Hexachloroethane	0.1888	Travis and Arms 1988	1	--
Indeno(1,2,3-cd)pyrene	0.0056	Travis and Arms 1988	0.41	Beyer and Stafford 1993
Isophorone*	4.0309	Travis and Arms 1988	1	--
Naphthalene	0.4425	Travis and Arms 1988	0.21	Beyer and Stafford 1993
Nitrobenzene*	3.3456	Travis and Arms 1988	1	--
N-Nitroso-di-n-propylamine*	6.009	Travis and Arms 1988	1	--
N-Nitrosodiphenylamine	0.5775	Travis and Arms 1988	1	--
Phenanthrene	0.0908	Travis and Arms 1988	0.28	Beyer and Stafford 1993
Phenol*	5.4021	Travis and Arms 1988	1	--
Pyrene	0.0431	Travis and Arms 1988	0.39	Beyer and Stafford 1993
Volatile Organic Compounds				
1,1,1-Trichloroethane*	1.4274	Travis and Arms 1988	1	--
1,1,2,2-Tetrachloroethane*	1.6091	Travis and Arms 1988	1	--
1,1,2-Trichloroethane*	2.5299	Travis and Arms 1988	1	--
1,1-Dichloroethane*	3.5759	Travis and Arms 1988	1	--
1,1-Dichloroethene*	2.2744	Travis and Arms 1988	1	--
1,2-Dibromo-3-Chloropropane*	1.7198	Travis and Arms 1988	1	--
1,2-Dibromoethane*	2.704	Travis and Arms 1988	1	--
1,2-Dichloroethane*	5.4744	Travis and Arms 1988	1	--
1,2-Dichloropropane*	2.8141	Travis and Arms 1988	1	--
2-Butanone*	26.6784	Travis and Arms 1988	1	--
2-Hexanone*	6.009	Travis and Arms 1988	1	--
Acetone*	53.2991	Travis and Arms 1988	1	--
Benzene*	2.2744	Travis and Arms 1988	1	--
Bromoform*	1.6971	Travis and Arms 1988	1	--
Bromomethane*	7.9466	Travis and Arms 1988	1	--

TABLE 13
Soil Bioconcentration Factors for Plants and Soil Invertebrates
Martin Aaron Site, Camden, NJ

Chemical	Soil-Plant BCF (dry weight)		Soil-Invertebrate BAF (dry weight)	
	Value	Reference	Value	Reference
Carbon Disulfide*	2.704	Travis and Arms 1988	1	--
Carbon Tetrachloride	1.0234	Travis and Arms 1988	1	--
Chloroethane*	5.7738	Travis and Arms 1988	1	--
Chloroform	3.0077	Travis and Arms 1988	1	--
Chloromethane*	11.5351	Travis and Arms 1988	1	--
Cis-1,2-Dichloroethene*	3.2578	Travis and Arms 1988	1	--
Cis-1,3-Dichloropropene*	2.704	Travis and Arms 1988	1	--
Dibromochloromethane*	2.1565	Travis and Arms 1988	1	--
Tetrachloroethene	1.1085	Travis and Arms 1988	1	--
Trans-1,2-Dichloroethene*	2.4634	Travis and Arms 1988	1	--
Trans-1,3-Dichloropropene*	2.704	Travis and Arms 1988	1	--
Trichloroethene	1.051	Travis and Arms 1988	1	--
Vinyl Chloride*	5.2602	Travis and Arms 1988	1	--
Xylenes (total)	0.5475	Travis and Arms 1988	1	--

Notes:

for chemicals without literature BCF/BAFs values, a default value of 1.0 was assumed

TABLE 14
Exposure Parameters for Upper Trophic Level Ecological Receptors
Martin Aaron Site, Camden, NJ

Parameter Type	Parameter	American robin		White-footed mouse	
		Value	Reference	Value	Reference
Physiological	Body Weight (kg)	0.0635	USEPA 1993	0.0141	Silva and Downing 1995
	Food Ingestion Rate (kg/day - dry)	0.00735	Levey and Karasov 1989	0.00073	Sample and Suter 1994
Dietary Composition (%)	Terrestrial Plants	51.6	Martin et al. 1951	51	Martin et al. 1951; Sample and Suter 1994
	Soil Invertebrates	43.6	Martin et al. 1951	47	Martin et al. 1951; Sample and Suter 1994
	Soil Ingestion	4.8	Sample and Suter 1994	2	Beyer et al. 1994

TABLE 15
Step 2 Screening Statistics for Surface Soil - Martin Aaron, Inc.
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No	Frequency of Detection	Maximum		Screening Value	Frequency of Exceedence	HQ ^a	HQ based on	
				Value	SampleID				RL ^b	Detection
SVOCs (ug/kg)	Acenaphthene	83-32-9	15 / 27	17000 J	MA-SB02-SS	20000	0 / 27	0.9		✓
	Acenaphthylene	208-96-8	15 / 27	2200 J	MA-SB112-SS	100	9 / 27	2200		✓
	Acetophenone	98-86-2	4 / 27	2900 J	MA-SB31-SS	NSV	0 / 27	--	--	--
	Anthracene	120-12-7	21 / 27	61000 J	MA-SB02-SS	100	15 / 27	6100		✓
	Atrazine	1912-24-9	0 / 27	11000 UJ	MA-SB02-SS	NSV	-- / --	--	--	--
	Benzaldehyde	100-52-7	10 / 27	1400 J	MA-SB11-SS	NSV	0 / 27	--	--	--
	Benzo(a)anthracene	56-55-3	26 / 27	120000 J	MA-SB02-SS	100	22 / 27	12000		✓
	Benzo(a)pyrene	50-32-8	25 / 27	110000 J	MA-SB02-SS	100	21 / 27	11000		✓
	Benzo(b)fluoranthene	205-99-2	24 / 27	110000 J	MA-SB02-SS	100	21 / 27	11000		✓
	Benzo(g,h,l)perylene	191-24-2	20 / 27	58000 J	MA-SB02-SS	100	18 / 27	5800		✓
	Benzo(k)fluoranthene	207-08-9	25 / 27	71000 J	MA-SB02-SS	100	21 / 27	7100		✓
	Biphenyl	92-52-4	9 / 27	4600 J	MA-SO201-SS	60000	0 / 27	0.1		✓
	Bromophenyl-4 Phenyl Ether	101-55-3	0 / 27	11000 UJ	MA-SB02-SS	NSV	-- / --	--	--	--
	Butylbenzyl phthalate	85-68-7	7 / 27	9200 J	MA-SO201-SS	NSV	0 / 27	--	--	--
	Caprolactam	105-60-2	1 / 27	28 J	MA-SB56-SS	NSV	0 / 27	--	--	--
	Carbazole	86-74-8	15 / 27	12000 J	MA-SB02-SS	NSV	0 / 27	--	--	--
	Chloroaniline-4	106-47-8	0 / 27	11000 UJ	MA-SB02-SS	NSV	-- / --	--	--	--
	Chloronaphthalene-2	91-58-7	0 / 27	11000 UJ	MA-SB02-SS	NSV	-- / --	--	--	--
	Chlorophenol-2	95-57-8	0 / 27	11000 UJ	MA-SB02-SS	100	-- / --	1100		✓
	Chlorophenyl-4 phenyl ether	7005-72-3	0 / 27	11000 UJ	MA-SB02-SS	NSV	-- / --	--	--	--
	Chrysene	218-01-9	26 / 27	120000 J	MA-SB02-SS	100	24 / 27	12000		✓
	Cresol-4,6-dinitro-ortho	534-52-1	0 / 27	28000 UJ	MA-SB02-SS	NSV	-- / --	--	--	--
	Cresol-o-	95-48-7	3 / 27	1000 J	MA-SO201-SS	100	1 / 27	100		✓
	Cresol-p-	106-44-5	4 / 27	940 J	MA-SO201-SS	100	3 / 27	94		✓
	Cresol-parachloro-meta	59-50-7	0 / 27	11000 UJ	MA-SB02-SS	NSV	-- / --	--	--	--
	Dibenzo(a,h)anthracene	53-70-3	20 / 27	19000 J	MA-SB02-SS	100	15 / 27	1900		✓
	Dibenzofuran	132-64-9	13 / 27	10000 J	MA-SB02-SS	NSV	0 / 27	--	--	--
	Dichlorobenzidine-3,3	91-94-1	0 / 27	11000 UJ	MA-SB02-SS	NSV	-- / --	--	--	--
	Dichlorophenol-2,4	120-83-2	0 / 27	11000 UJ	MA-SB02-SS	50	-- / --	2200		✓
	Dimethylphenol-2,4	105-67-9	1 / 27	65 J	MA-SB09-SS	100	0 / 27	0.7		✓
	Dinitrophenol-2,4	51-28-5	0 / 27	28000 UJ	MA-SB02-SS	20000	-- / --	214		✓
	Dinitrotoluene-2,4	121-14-2	0 / 27	11000 UJ	MA-SB02-SS	NSV	-- / --	--	--	--
	Dinitrotoluene-2,6	606-20-2	0 / 27	11000 UJ	MA-SB02-SS	NSV	-- / --	--	--	--
	Ether, bis(2-chloroethyl)	111-44-4	0 / 27	11000 UJ	MA-SB02-SS	NSV	-- / --	--	--	--
	Ether, bis-chloroisopropyl	108-60-1	0 / 27	11000 UJ	MA-SB02-SS	NSV	-- / --	--	--	--
	Fluoranthene	206-44-0	26 / 27	290000 J	MA-SB02-SS	100	23 / 27	29000		✓
	Fluorene	86-73-7	13 / 27	22000 J	MA-SB02-SS	100	12 / 27	2200		✓
	Hexachlorobenzene	118-74-1	0 / 27	11000 UJ	MA-SB02-SS	50	-- / --	2200		✓
	Hexachlorobutadiene	87-68-3	0 / 27	11000 UJ	MA-SB02-SS	NSV	-- / --	--	--	--
	Hexachlorocyclopentadiene	77-47-4	0 / 27	11000 UJ	MA-SB02-SS	10000	-- / --	111		✓
	Hexachloroethane	67-72-1	0 / 27	11000 UJ	MA-SB02-SS	NSV	-- / --	--	--	--
	Indeno(1,2,3-cd)pyrene	193-39-5	23 / 27	59000 J	MA-SB02-SS	100	20 / 27	5900		✓
	Isophorone	78-59-1	1 / 27	23 J	MA-SB09-SS	NSV	0 / 27	--	--	--
	Methane, bis(2-chloroethoxy)	111-91-1	0 / 27	11000 UJ	MA-SB02-SS	NSV	-- / --	--	--	--
	Methylnaphthalene-2	91-57-6	12 / 27	7400 J	MA-SB31-SS	NSV	0 / 27	--	--	--
	Naphthalene	91-20-3	15 / 27	34000 J	MA-SO201-SS	100	13 / 27	3400		✓
	Nitroaniline-2	88-74-4	0 / 27	28000 UJ	MA-SB02-SS	NSV	-- / --	--	--	--
	Nitroaniline-3	99-09-2	0 / 27	28000 UJ	MA-SB02-SS	NSV	-- / --	--	--	--
	Nitroaniline-4	100-01-6	0 / 27	28000 UJ	MA-SB02-SS	NSV	-- / --	--	--	--

TABLE 15
Step 2 Screening Statistics for Surface Soil - Martin Aaron, Inc.
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No	Frequency of Detection	Maximum		Screening Value	Frequency of Exceedence	HQ ^a	HQ based on	
				Value	SampleID				RL ^b	Detection
Organic Compounds	Nitrobenzene	98-95-3	0 / 27	11000 UJ	MA-SB02-SS	NSV	-- / --	--	--	--
	Nitrophenol-2	88-75-5	0 / 27	11000 UJ	MA-SB02-SS	NSV	-- / --	--	--	--
	Nitrophenol-4	100-02-7	0 / 27	28000 UJ	MA-SB02-SS	7000	-- / --	40	✓	
	Nitroso-di-n-propyl-amine-N	621-64-7	0 / 27	11000 UJ	MA-SB02-SS	NSV	-- / --	--	--	--
	Nitrosodiphenylamine-n	86-30-6	1 / 27	1300	MA-SO201-SS	20000	0 / 27	0.1		✓
	PCP (Pentachlorophenol)	87-86-5	1 / 27	1100 J	MA-SB31-SS	3000	0 / 27	0.4		✓
	Phenanthrene	85-01-8	26 / 27	220000 J	MA-SB02-SS	100	22 / 27	2200	0	✓
	Phenol	108-95-2	2 / 27	3200	MA-SO201-SS	30000	0 / 27	0.1		✓
	Phthalate, bis(2-ethylhexyl) (DEHP)	117-81-7	11 / 27	59000	MA-SO201-SS	NSV	0 / 27	--	--	--
	Phthalate, di-n-butyl	84-74-2	16 / 27	9100	MA-SB08-SS	200000	0 / 27	0.05		✓
	Phthalate, di-n-octyl	117-84-0	2 / 27	280 J	MA-SB09-SS	NSV	0 / 27	--	--	--
	Phthalate, diethyl	84-66-2	4 / 27	5700 J	MA-SO201-SS	100000	0 / 27	0.1		✓
	Phthalate, dimethyl	131-11-3	0 / 27	11000 UJ	MA-SB02-SS	200000	-- / --	0.1		✓
	Pyrene	129-00-0	26 / 27	230000 J	MA-SB02-SS	100	24 / 27	2300	0	✓
	Trichlorophenol-2,4,5	95-95-4	0 / 27	28000 UJ	MA-SB02-SS	9000	-- / --	3.1		✓
	Trichlorophenol-2,4,6	88-06-2	0 / 27	11000 UJ	MA-SB02-SS	4000	-- / --	2.8		✓
Pesticides/PCBs (ug/kg)	Aldrin	309-00-2	5 / 27	1300	MA-SB60-SS	100	2 / 27	13.0		✓
	BHC, alpha	319-84-6	0 / 27	42 U	MA-SO201-SS	100000	-- / --	< 0.01		✓
	BHC, beta	319-85-7	2 / 27	37	MA-SB60-SS	100000	0 / 27	< 0.01		✓
	BHC, delta	319-86-8	0 / 27	42 U	MA-SO201-SS	100000	-- / --	< 0.01		✓
	BHC, gamma (Lindane)	58-89-9	1 / 27	1.9 NJ	MA-SO212-SS-1.0	100	0 / 27	0.02		✓
	Chlordane, alpha	5103-71-9	16 / 27	8100 JN	MA-SB60-SS	100	7 / 27	81.0		✓
	Chlordane - gamma (technical mixture)	12789-03-6	16 / 27	8900	MA-SB60-SS	NSV	0 / 27	--	--	--
	DDD-4,4	72-54-8	1 / 27	8.7	MA-SB56-SS	100	0 / 27	0.1		✓
	DDE-4,4	72-55-9	19 / 27	15000 J	MA-SO201-SS	100	9 / 27	150.0		✓
	DDT-4,4	50-29-3	10 / 27	2600	MA-SB130-SS	100	2 / 27	26.0		✓
	Dieleadrin	60-57-1	8 / 27	1300	MA-SB124-SS	100	3 / 27	13.0		✓
	Endosulfan I (alpha)	959-98-8	1 / 27	120	MA-SB60-SS	NSV	0 / 27	--	--	--
	Endosulfan II (beta)	33213-65-9	1 / 27	25 J	MA-SB124-SS	NSV	0 / 27	--	--	--
	Endosulfan Sulfate	1031-07-8	6 / 27	180 JN	MA-SB06-SS	NSV	0 / 27	--	--	--
	Endrin	72-20-8	9 / 27	190 J	MA-SB06-SS	100	2 / 27	11.9		✓
	Endrin Aldehyde	7421-93-4	4 / 27	40	MA-SB112-SS	100	0 / 27	0.4		✓
	Endrin ketone	53494-70-5	8 / 27	120	MA-SO214-SS	100	1 / 27	1.2		✓
	Heptachlor	76-44-8	3 / 27	260 J	MA-SB06-SS	NSV	0 / 27	--	--	--
	Heptachlor Epoxide	1024-57-3	2 / 27	19 J	MA-SB31-SS	100	0 / 27	0.2		✓
	Methoxychlor	72-43-5	4 / 27	1800 J	MA-SB06-SS	100	3 / 27	18.0		✓
	Pcb-araclor 1016	12674-11-2	0 / 27	810 U	MA-SO201-SS	371	-- / --	2.2		✓
	Pcb-araclor 1221	11104-28-2	0 / 27	1600 U	MA-SO201-SS	371	-- / --	4.3		✓
	Pcb-araclor 1232	11141-16-5	0 / 27	810 U	MA-SO201-SS	371	-- / --	2.2		✓
	Pcb-araclor 1242	53469-21-9	0 / 27	810 U	MA-SO201-SS	371	-- / --	2.2		✓
	Pcb-araclor 1248	12672-29-6	1 / 27	840 J	MA-SB81-SS	371	1 / 27	2.3		✓
	Pcb-araclor 1254	11097-69-1	8 / 27	19000	MA-SO201-SS	371	4 / 27	51.2		✓
	Pcb-araclor 1260	11096-82-5	3 / 27	7200 J	MA-SB08-SS	NSV	0 / 27	--	--	--
	Toxaphene	8001-35-2	0 / 27	4200 U	MA-SO201-SS	NSV	-- / --	--	--	--
VOCs (ug/kg)	Acetone	67-64-1	15 / 27	460 J	MA-SO214-SS	NSV	0 / 27	--	--	--
	Benzene	71-43-2	12 / 27	4500	MA-SO201-SS	8	4 / 27	562.5		✓
	Bromoform	75-25-2	2 / 27	2 J	MA-SB04-SS	NSV	0 / 27	--	--	--
	Bromomethane	74-83-9	2 / 27	120 J	MA-SB60-SS	NSV	0 / 27	--	--	--
	Carbon disulfide	75-15-0	10 / 27	130	MA-SB11-SS	NSV	0 / 27	--	--	--

TABLE 15
Step 2 Screening Statistics for Surface Soil - Martin Aaron, Inc.
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No	Frequency of Detection	Maximum		Screening Value	Frequency of Exceedance	HQ ^a	HQ based on	
				Value	SampleID				RL ^b	Detection
	Carbon tetrachloride	56-23-5	0 / 27	14000 U	MA-SB31-SS	300	-- / --	46.7	✓	
	Chlorobenzene	108-90-7	2 / 27	3200	MA-SB60-SS	40000	0 / 27	0.1		✓
	Chloroethane	75-00-3	1 / 27	2700 J	MA-SB60-SS	NSV	0 / 27	--	--	--
	Chloroform	67-66-3	3 / 27	1400	MA-SO201-SS	100	1 / 27	14.0		✓
	Chloromethane	74-87-3	0 / 27	14000 U	MA-SB31-SS	NSV	-- / --	--	--	--
	Cyclohexane	110-82-7	4 / 27	66 J	MA-SB08-SS	NSV	0 / 27	--	--	--
	DBCP (1,2-dibromo-3-chloropropane)	96-12-8	0 / 27	14000 U	MA-SB31-SS	NSV	-- / --	--	--	--
	Dibromochloromethane	124-48-1	0 / 27	14000 U	MA-SB31-SS	NSV	-- / --	--	--	--
	Dibromoethane-1,2	106-93-4	0 / 27	14000 U	MA-SB31-SS	5000	-- / --	28	✓	
	Dichlorobenzene-1,2	95-50-1	5 / 27	5500	MA-SB60-SS	100	3 / 27	55.0		✓
	Dichlorobenzene-1,3	541-73-1	0 / 27	14000 U	MA-SB31-SS	NSV	-- / --	--	--	--
	Dichlorobenzene-1,4	106-46-7	2 / 27	230 J	MA-SB60-SS	20000	0 / 27	0.01		✓
	Dichlorobromomethane	75-27-4	0 / 27	14000 U	MA-SB31-SS	450000	-- / --	0.03	✓	
	Dichlorodifluoromethane	75-71-8	0 / 27	14000 U	MA-SB31-SS	NSV	-- / --	--	--	--
	Dichloroethane-1,1	75-34-3	5 / 27	11000 J	MA-SB31-SS	300	3 / 27	36.7		✓
	Dichloroethane-1,2	107-06-2	0 / 27	14000 U	MA-SB31-SS	100	-- / --	140.0	✓	
	Dichloroethylene-1,2 trans	156-60-5	3 / 27	350 J	MA-SB60-SS	300	1 / 27	1.2		✓
	Dichloroethylene-1,1	75-35-4	1 / 27	2 J	MA-SB02-SS	NSV	0 / 27	--	--	--
	Dichloroethylene-1,2 cis	156-59-2	9 / 27	24000	MA-SB31-SS	300	3 / 27	80.0		✓
	Dichloropropane-1,2	78-87-5	0 / 27	14000 U	MA-SB31-SS	100	-- / --	140.0	✓	
	Dichloropropene-1,3 cis	10061-01-5	0 / 27	14000 U	MA-SB31-SS	300	-- / --	46.7	✓	
	Dichloropropene-1,3 trans	10061-02-6	0 / 27	14000 U	MA-SB31-SS	300	-- / --	46.7	✓	
	Ethylbenzene	100-41-4	7 / 27	7500	MA-SO201-SS	10000	0 / 27	0.8		✓
	Freon 113 (1,1,2-trichloro-1,2,2-trifluoroethane)	76-13-1	0 / 27	14000 U	MA-SB31-SS	NSV	-- / --	--	--	--
	Hexanone-2	591-78-6	2 / 27	410 J	MA-SO201-SS	NSV	0 / 27	--	--	--
	Isopropylbenzene	98-82-8	4 / 27	590 J	MA-SO201-SS	NSV	0 / 27	--	--	--
	Methyl acetate	79-20-9	2 / 27	1300	MA-SB60-SS	NSV	0 / 27	--	--	--
	Methyl cyclohexane	108-87-2	9 / 27	5000 J	MA-SB31-SS	NSV	0 / 27	--	--	--
	Methyl ethyl ketone (2-butanone)	78-93-3	10 / 27	250 J	MA-SB60-SS	NSV	0 / 27	--	--	--
	Methyl isobutyl ketone (4-methyl-2-pentanone)	108-10-1	6 / 27	470 J	MA-SB60-SS	100000	0 / 27	<0.01		✓
	Methyl tertiary butyl ether (MTBE)	1634-04-4	0 / 27	14000 UJ	MA-SB31-SS	NSV	-- / --	--	--	--
	Methylene chloride	75-09-2	1 / 27	71	MA-SB130-SS	100	0 / 27	0.7		✓
	Styrene	100-42-5	1 / 27	7 J	MA-SB11-SS	300000	0 / 27	<0.01		✓
	Tetrachloroethane-1,1,2,2	79-34-5	0 / 27	14000 U	MA-SB31-SS	100	-- / --	140.0	✓	
	Tetrachloroethylene	127-18-4	16 / 27	26000	MA-SB31-SS	300	3 / 27	86.7		✓
	Toluene	108-88-3	18 / 27	160000	MA-SB31-SS	200000	0 / 27	0.8		✓
	Trichlorobenzene-1,2,4	120-82-1	1 / 27	5900	MA-SO201-SS	20000	0 / 27	0.3		✓
	Trichloroethane-1,1,1	71-55-6	3 / 27	2000	MA-SB60-SS	100	1 / 27	20.0		✓
	Trichloroethane-1,1,2	79-00-5	0 / 27	14000 U	MA-SB31-SS	100	-- / --	140.0	✓	
	Trichloroethylene	79-01-6	15 / 27	60000	MA-SB31-SS	300	3 / 27	200.0		✓
	Trichlorofluoromethane	75-69-4	2 / 27	3 J	MA-SB130-SS	NSV	0 / 27	--	--	--
	Vinyl chloride	75-01-4	3 / 27	320 J	MA-SB60-SS	300	1 / 27	1.1		✓
	Xylenes, total	1330-20-7	11 / 27	48000	MA-SO201-SS	100	5 / 27	480.0		✓
Inorganics (mg/kg)	Aluminum	7429-90-5	27 / 27	13300	MA-SB56-SS	47000	0 / 27	0.3		✓
	Antimony	7440-36-0	0 / 27	7.6 BJ	MA-SB31-SS	5	-- / --	15		✓
	Arsenic	7440-38-2	27 / 27	766	MA-SB60-SS	9.9	22 / 27	7.74		✓
	Barium	7440-39-3	25 / 27	37900	MA-SB81-SS	283	21 / 27	133.9		✓
	Beryllium	7440-41-7	0 / 27	1.2 B	MA-SB81-SS	10	-- / --	0.1	✓	
	Cadmium	7440-43-9	20 / 27	110	MA-SB31-SS	4	10 / 27	27.5		✓

TABLE 15
Step 2 Screening Statistics for Surface Soil - Martin Aaron, Inc.
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No	Frequency of Detection	Maximum		Screening Value	Frequency of Exceedence	HQ ^a	HQ based on	
				Value	SampleID				RL ^b	Detection
	Calcium	7440-70-2	25 / 27	45800	MA-SO204-SS-0.5	NSV	0 / 27	--	--	--
	Chromium	7440-47-3	27 / 27	1080	MA-SB124-SS	0.4	27 / 27	27.00	0	✓
	Cobalt	7440-48-4	4 / 27	42	MA-SB124-SS	20	2 / 27	2.1		✓
	Copper	7440-50-8	26 / 27	1400	MA-SB130-SS	60	16 / 27	23.5		✓
	Iron	7439-89-6	27 / 27	103000	MA-SO201-SS	18000	15 / 27	557		✓
	Lead	7439-92-1	27 / 27	3310	MA-SB97-SS	40.5	24 / 27	81.7		✓
	Magnesium	7439-95-4	21 / 27	16900	MA-SB60-SS	4400	10 / 27	3.8		✓
	Manganese	7439-96-5	27 / 27	744 J	MA-SB11-SS	330	9 / 27	2.3		✓
	Mercury	7439-97-6	22 / 25	3.1	MA-SB56-SS	0.058	22 / 25	53.4		✓
	Nickel	7440-02-0	20 / 27	576	MA-SB31-SS	30	4 / 27	19.2		✓
	Potassium	7440-09-7	3 / 27	1370 J	MA-SB02-SS	NSV	0 / 27	--	--	--
	Selenium	7782-49-2	16 / 27	4.3	MA-SB31-SS	0.21	16 / 27	20.5		✓
	Silver	7440-22-4	2 / 27	45.7	MA-SB31-SS	2	2 / 27	22.9		✓
	Sodium	7440-23-5	11 / 27	4770 J	MA-SB81-SS	NSV	0 / 27	--	--	--
	Thallium	7440-28-0	0 / 27	1.4 UJ	MA-SB31-SS	1	-- / --	1.4		✓
	Vanadium	7440-62-2	27 / 27	41.4	MA-SO201-SS	2	27 / 27	20.7		✓
	Zinc	7440-66-6	27 / 27	6640	MA-SB81-SS	8.5	27 / 27	78.12		✓

Notes:

^aHQ = Hazard Quotient

^bRL = reporting limit

NSV = no screening value

Shaded cells indicated chemicals with Hazard Quotients greater than 1

303166

TABLE 16
Step 2 Screening Statistics for Surface Soil - South Jersey Port Corporation
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No	Frequency of Detection	Maximum		Screening Value	Frequency of Exceedence	HQ ^a	HQ based on	
				Value	SampleID				RL ^b	Detection
SVOCs (ug/kg)	Acenaphthene	83-32-9	4 / 14	34000 J	MA-SO301-SS-1.0	20000	1 / 14	117		✓
	Acenaphthylene	208-96-8	2 / 14	380 J	MA-SB72-SS-0.5	100	1 / 14	318		✓
	Acetophenone	98-86-2	0 / 14	120000 UJ	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Anthracene	120-12-7	8 / 14	65000 J	MA-SO301-SS-1.0	100	8 / 14	650.0		✓
	Atrazine	1912-24-9	0 / 14	120000 UJ	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Benzaldehyde	100-52-7	0 / 14	120000 UJ	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Benzo(a)anthracene	56-55-3	11 / 14	130000 J	MA-SO301-SS-1.0	100	11 / 14	1300.0		✓
	Benzo(a)pyrene	50-32-8	11 / 14	97000 J	MA-SO301-SS-1.0	100	11 / 14	970.0		✓
	Benzo(b)fluoranthene	205-99-2	11 / 14	97000 J	MA-SO301-SS-1.0	100	11 / 14	970.0		✓
	Benzo(g,h,i)perylene	191-24-2	10 / 14	34000 J	MA-SO301-SS-1.0	100	9 / 14	340.0		✓
	Benzo(k)fluoranthene	207-08-9	11 / 14	110000 J	MA-SO301-SS-1.0	100	11 / 14	1100.0		✓
	Biphenyl	92-52-4	0 / 14	120000 UJ	MA-SO301-SS-1.0	60000	-- / --	2.0		✓
	Bromophenyl-4 Phenyl Ether	101-55-3	0 / 14	120000 UJ	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Butylbenzyl phthalate	85-68-7	0 / 14	120000 UJ	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Caprolactam	105-60-2	0 / 14	120000 UJ	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Carbazole	86-74-8	5 / 14	43000 J	MA-SO301-SS-1.0	NSV	0 / 14	--	--	--
	Chloroaniline-4	106-47-8	0 / 14	120000 UJ	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Chloronaphthalene-2	91-58-7	0 / 14	120000 UJ	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Chlorophenol-2	95-57-8	0 / 14	120000 UJ	MA-SO301-SS-1.0	100	-- / --	1200.0		✓
	Chlorophenyl-4 phenyl ether	7005-72-3	0 / 14	120000 UJ	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Chrysene	218-01-9	11 / 14	130000 J	MA-SO301-SS-1.0	100	11 / 14	1300.0		✓
	Cresol-4,6-dinitro-ortho	534-52-1	0 / 14	300000 UJ	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Cresol-o	95-48-7	0 / 14	120000 UJ	MA-SO301-SS-1.0	100	-- / --	1200.0		✓
	Cresol-p	106-44-5	0 / 14	120000 UJ	MA-SO301-SS-1.0	100	-- / --	1200.0		✓
	Cresol-parachloro-meta	59-50-7	0 / 14	120000 UJ	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Dibenzo(a,h)anthracene	53-70-3	4 / 14	800 J	MA-SO303-SS-1.0	100	3 / 14	8.0		✓
	Dibenzofuran	132-64-9	3 / 14	27000 J	MA-SO301-SS-1.0	NSV	0 / 14	--	--	--
	Dichlorobenzidine-3,3	91-94-1	0 / 14	120000 UJ	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Dichlorophenol-2,4	120-83-2	0 / 14	120000 UJ	MA-SO301-SS-1.0	50	-- / --	2400.0		✓
	Dimethylphenol-2,4	105-67-9	0 / 14	120000 UJ	MA-SO301-SS-1.0	100	-- / --	1200.0		✓
	Dinitrophenol-2,4	51-28-5	0 / 14	300000 UJ	MA-SO301-SS-1.0	20000	-- / --	15.0		✓
	Dinitrotoluene-2,4	121-14-2	0 / 14	120000 UJ	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Dinitrotoluene-2,6	606-20-2	0 / 14	120000 UJ	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Ether, bis(2-chloroethyl)	111-44-4	0 / 14	120000 UJ	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Ether, bis-chloroisopropyl	108-60-1	0 / 14	120000 UJ	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Fluoranthene	206-44-0	12 / 14	330000 J	MA-SO301-SS-1.0	100	12 / 14	3300.0		✓
	Fluorene	86-73-7	4 / 14	42000 J	MA-SO301-SS-1.0	100	3 / 14	420.0		✓
	Hexachlorobenzene	118-74-1	0 / 14	120000 UJ	MA-SO301-SS-1.0	50	-- / --	2400.0		✓
	Hexachlorobutadiene	87-68-3	0 / 14	120000 UJ	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Hexachlorocyclopentadiene	77-47-4	0 / 14	120000 UJ	MA-SO301-SS-1.0	10000	-- / --	12.0		✓
	Hexachloroethane	67-72-1	0 / 14	120000 UJ	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Indeno(1,2,3-cd)pyrene	193-39-5	10 / 14	40000 J	MA-SO301-SS-1.0	100	10 / 14	400.0		✓
	Isophorone	78-59-1	0 / 14	120000 UJ	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Methane, bis(2-chloroethoxy)	111-91-1	0 / 14	120000 UJ	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Methylnaphthalene-2	91-57-6	2 / 14	410 J	MA-SO303-SS-1.0	NSV	0 / 14	--	--	--
	Naphthalene	91-20-3	2 / 14	650 J	MA-SO303-SS-1.0	100	1 / 14	65.0		✓
	Nitroaniline-2	88-74-4	0 / 14	300000 UJ	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Nitroaniline-3	99-09-2	0 / 14	300000 UJ	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Nitroaniline-4	100-01-6	0 / 14	300000 UJ	MA-SO301-SS-1.0	NSV	-- / --	--	--	--

TABLE 16
Step 2 Screening Statistics for Surface Soil - South Jersey Port Corporation
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No	Frequency of Detection	Maximum		Screening Value	Frequency of Exceedence	HQ ^a	HQ based on	
				Value	SampleID				RL ^b	Detection
Organic Compounds	Nitrobenzene	98-95-3	0 / 14	120000 UJ	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Nitrophenol-2	88-75-5	0 / 14	120000 UJ	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Nitrophenol-4	100-02-7	0 / 14	300000 UJ	MA-SO301-SS-1.0	7000	-- / --	42.9	✓	
	Nitroso-di-n-propyl-amine-N	621-64-7	0 / 14	120000 UJ	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Nitrosodiphenylamine-n	86-30-6	0 / 14	120000 UJ	MA-SO301-SS-1.0	20000	-- / --	6.0	✓	
	PCP ^c (Pentachlorophenol)	87-86-5	0 / 14	300000 UJ	MA-SO301-SS-1.0	3000	-- / --	100.0	✓	
	Phenanthrene	85-01-8	10 / 14	340000 J	MA-SO301-SS-1.0	100	10 / 14	3400.0		✓
	Phenol	108-95-2	0 / 14	120000 UJ	MA-SO301-SS-1.0	30000	-- / --	30.0	✓	
	Phthalate, bis(2-ethylhexyl) (DEHP)	117-81-7	3 / 14	240 J	MA-SB62-SS-1	NSV	0 / 14	--	--	--
	Phthalate, di-n-butyl	84-74-2	0 / 14	120000 UJ	MA-SO301-SS-1.0	200000	-- / --	0.6	✓	
	Phthalate, di-n-octyl	117-84-0	0 / 14	120000 UJ	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Phthalate, diethyl	84-66-2	0 / 14	120000 UJ	MA-SO301-SS-1.0	100000	-- / --	12.0	✓	
	Phthalate, dimethyl	131-11-3	0 / 14	120000 UJ	MA-SO301-SS-1.0	200000	-- / --	0.6	✓	
	Pyrene	129-00-0	12 / 14	220000 J	MA-SO301-SS-1.0	100	12 / 14	2200.0		✓
	Trichlorophenol-2,4,5	95-95-4	0 / 14	300000 UJ	MA-SO301-SS-1.0	9000	-- / --	33.3	✓	
	Trichlorophenol-2,4,6	88-06-2	0 / 14	120000 UJ	MA-SO301-SS-1.0	4000	-- / --	30.0	✓	
Pesticides/PCBs (ug/kg)	Aldrin	309-00-2	0 / 14	2.0 UJ	MA-SB77-SS-1.0	100	-- / --	0.02	✓	
	BHC, alpha	319-84-6	0 / 14	2.0 UJ	MA-SB77-SS-1.0	100000	-- / --	<0.01	✓	
	BHC, beta	319-85-7	0 / 14	2.0 UJ	MA-SB77-SS-1.0	100000	-- / --	<0.01	✓	
	BHC, delta	319-86-8	0 / 14	2.0 UJ	MA-SB77-SS-1.0	100000	-- / --	<0.01	✓	
	BHC, gamma (Lindane)	58-89-9	0 / 14	2.0 UJ	MA-SB77-SS-1.0	100	-- / --	0.02	✓	
	Chlordane - alpha	5103-71-9	1 / 14	2.0 J	MA-SB69-SS-1.0	100	0 / 14	0.02		✓
	Chlordane - gamma (technical mixture)	12789-03-6	1 / 14	4.8 J	MA-SB29-SS-1.0	NSV	0 / 14	--	--	--
	DDD-4,4	72-54-8	1 / 14	5.0 J	MA-SB66-SS-0.5	100	0 / 14	0.1		✓
	DDE-4,4	72-55-9	2 / 14	6.1 J	MA-SB62-SS-1	100	0 / 14	0.1		✓
	DDT-4,4	50-29-3	4 / 14	6.8 J	MA-SB66-SS-0.5	100	0 / 14	0.1		✓
	Dieldrin	60-57-1	0 / 14	3.9 UJ	MA-SB77-SS-1.0	100	-- / --	0.04	✓	
	Endosulfan I (alpha)	959-98-8	1 / 14	2.3 J	MA-SB69-SS-1.0	NSV	0 / 14	--	--	--
	Endosulfan II (beta)	33213-65-9	0 / 14	3.9 UJ	MA-SB77-SS-1.0	NSV	-- / --	--	--	--
	Endosulfan Sulfate	1031-07-8	0 / 14	3.9 UJ	MA-SB77-SS-1.0	NSV	-- / --	--	--	--
	Endrin	72-20-8	1 / 14	49.0 J	MA-SO301-SS-1.0	100	0 / 14	0.5		✓
	Endrin Aldehyde	7421-93-4	0 / 14	3.9 UJ	MA-SB77-SS-1.0	100	-- / --	0.04	✓	
	Endrin ketone	53494-70-5	3 / 14	8.4 J	MA-SB67-SS-1.0	100	0 / 14	0.1		✓
	Heptachlor	76-44-8	1 / 14	4.9 J	MA-SO301-SS-1.0	NSV	0 / 14	--	--	--
	Heptachlor Epoxide	1024-57-3	0 / 14	2.0 UJ	MA-SB77-SS-1.0	100	-- / --	0.02	✓	
	Methoxychlor	72-43-5	0 / 14	20.0 UJ	MA-SB77-SS-1.0	100	-- / --	0.2		✓
	Pcb-araclor 1016	12674-11-2	0 / 14	39.0 UJ	MA-SB77-SS-1.0	371	-- / --	0.1		✓
	Pcb-araclor 1221	11104-28-2	0 / 14	80.0 UJ	MA-SO301-SS-1.0	371	-- / --	0.2		✓
	Pcb-araclor 1232	11141-16-5	0 / 14	39.0 UJ	MA-SB77-SS-1.0	371	-- / --	0.1		✓
	Pcb-araclor 1242	53469-21-9	0 / 14	39.0 UJ	MA-SB77-SS-1.0	371	-- / --	0.1		✓
	Pcb-araclor 1248	12672-29-6	0 / 14	39.0 UJ	MA-SB77-SS-1.0	371	-- / --	0.1		✓
	Pcb-araclor 1254	11097-69-1	0 / 14	39.0 UJ	MA-SB77-SS-1.0	371	-- / --	0.1		✓
	Pcb-araclor 1260	11096-82-5	0 / 14	39.0 UJ	MA-SB77-SS-1.0	NSV	-- / --	--	--	--
	Toxaphene	8001-35-2	0 / 14	200.0 UJ	MA-SB77-SS-1.0	NSV	-- / --	--	--	--
VOCs (ug/kg)	Acetone	67-64-1	6 / 14	21.0	MA-SB72-SS-0.5	NSV	0 / 14	--	--	--
	Benzene	71-43-2	0 / 14	15.0 U	MA-SO301-SS-1.0	8	-- / --	1.9	✓	
	Bromoform	75-25-2	0 / 14	15.0 U	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Bromomethane	74-83-9	0 / 14	15.0 U	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Carbon disulfide	75-15-0	0 / 14	15.0 U	MA-SO301-SS-1.0	NSV	-- / --	--	--	--

TABLE 16
Step 2 Screening Statistics for Surface Soil - South Jersey Port Corporation
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No	Frequency of Detection	Maximum		Screening Value	Frequency of Exceedance	HQ ^a	HQ based on	
				Value	SampleID				RL ^b	Detection
	Carbon tetrachloride	56-23-5	0 / 14	15.0 U	MA-SO301-SS-1.0	300	-- / --	0.1	✓	
	Chlorobenzene	108-90-7	0 / 14	15.0 U	MA-SO301-SS-1.0	40000	-- / --	< 0.01	✓	
	Chloroethane	75-00-3	0 / 14	15.0 U	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Chloroform	67-66-3	0 / 14	15.0 U	MA-SO301-SS-1.0	100	-- / --	0.2	✓	
	Chloromethane	74-87-3	0 / 14	15.0 U	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Cyclohexane	110-82-7	0 / 14	15.0 U	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	DBCP (1,2-dibromo-3-chloropropane)	96-12-8	0 / 14	15.0 U	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Dibromochloromethane	124-48-1	0 / 14	15.0 U	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Dibromoethane-1,2	106-93-4	0 / 14	15.0 U	MA-SO301-SS-1.0	5000	-- / --	< 0.01	✓	
	Dichlorobenzene-1,2	95-50-1	0 / 14	15.0 U	MA-SO301-SS-1.0	100	-- / --	0.2	✓	
	Dichlorobenzene-1,3	541-73-1	0 / 14	15.0 U	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Dichlorobenzene-1,4	106-46-7	0 / 14	15.0 U	MA-SO301-SS-1.0	20000	-- / --	< 0.01	✓	
	Dichlorobromomethane	75-27-4	0 / 14	15.0 U	MA-SO301-SS-1.0	450000	-- / --	< 0.01	✓	
	Dichlorodifluoromethane	75-71-8	0 / 14	15.0 UJ	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Dichloroethane-1,1	75-34-3	0 / 14	15.0 U	MA-SO301-SS-1.0	300	-- / --	0.1	✓	
	Dichloroethane-1,2	107-06-2	0 / 14	15.0 U	MA-SO301-SS-1.0	100	-- / --	0.2	✓	
	Dichloroethylene-1,2 trans	156-60-5	0 / 14	15.0 U	MA-SO301-SS-1.0	300	-- / --	0.1	✓	
	Dichloroethylene-1,1	75-35-4	0 / 14	15.0 U	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Dichloroethylene-1,2 cis	156-59-2	0 / 14	15.0 U	MA-SO301-SS-1.0	300	-- / --	0.1	✓	
	Dichloropropane-1,2	78-87-5	0 / 14	15.0 U	MA-SO301-SS-1.0	100	-- / --	0.2	✓	
	Dichloropropene-1,3 cis	10061-01-5	0 / 14	15.0 U	MA-SO301-SS-1.0	300	-- / --	0.1	✓	
	Dichloropropene-1,3 trans	10061-02-6	0 / 14	15.0 U	MA-SO301-SS-1.0	300	-- / --	0.1	✓	
	Ethylbenzene	100-41-4	0 / 14	15.0 U	MA-SO301-SS-1.0	10000	-- / --	< 0.01	✓	
	Freon 113 (1,1,2-trichloro-1,2,2-trifluoroethane)	76-13-1	0 / 14	15.0 U	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Hexanone-2	591-78-6	0 / 14	15.0 U	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Isopropylbenzene	98-82-8	0 / 14	15.0 U	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Methyl acetate	79-20-9	0 / 14	15.0 U	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Methyl cyclohexane	108-87-2	0 / 14	15.0 U	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Methyl ethyl ketone (2-butanone)	78-93-3	1 / 14	8.0 J	MA-SB67-SS-1.0	NSV	0 / 14	--	--	--
	Methyl isobutyl ketone (4-methyl-2-pentanone)	108-10-1	0 / 14	15.0 U	MA-SO301-SS-1.0	100000	-- / --	< 0.01	✓	
	Methyl tertiary butyl ether (MTBE)	1634-04-4	0 / 14	15.0 U	MA-SO301-SS-1.0	NSV	-- / --	--	--	--
	Methylene chloride	75-09-2	0 / 14	32.0 U	MA-SB68-SS-1.0	100	-- / --	0.3	✓	
	Styrene	100-42-5	0 / 14	15.0 U	MA-SO301-SS-1.0	300000	-- / --	< 0.01	✓	
	Tetrachloroethane-1,1,2,2	79-34-5	0 / 14	15.0 U	MA-SO301-SS-1.0	100	-- / --	0.2	✓	
	Tetrachloroethylene	127-18-4	0 / 14	15.0 U	MA-SO301-SS-1.0	300	-- / --	0.1	✓	
	Toluene	108-88-3	1 / 14	2.0 J	MA-SB68-SS-1.0	200000	0 / 14	< 0.01	✓	
	Trichlorobenzene-1,2,4	120-82-1	0 / 14	15.0 U	MA-SO301-SS-1.0	20000	-- / --	< 0.01	✓	
	Trichloroethane-1,1,1	71-55-6	0 / 14	15.0 U	MA-SO301-SS-1.0	100	-- / --	0.2	✓	
	Trichloroethane-1,1,2	79-00-5	0 / 14	15.0 U	MA-SO301-SS-1.0	100	-- / --	0.2	✓	
	Trichloroethylene	79-01-6	0 / 14	15.0 U	MA-SO301-SS-1.0	300	-- / --	0.1	✓	
	Trichlorofluoromethane	75-69-4	2 / 14	1.0 J	MA-SB66-SS-0.5	NSV	0 / 14	--	--	--
	Vinyl chloride	75-01-4	0 / 14	15.0 U	MA-SO301-SS-1.0	300	-- / --	0.1	✓	
	Xylenes, total	1330-20-7	0 / 14	15.0 U	MA-SO301-SS-1.0	100	-- / --	0.2	✓	
Inorganics (ug/kg)	Aluminum	7429-90-5	14 / 14	9000.0	MA-SB68-SS-1.0	47000	0 / 14	0.2		✓
	Antimony	7440-36-0	6 / 14	1.9 J	MA-SB75-SS-1.0	5	0 / 14	0.4		✓
	Arsenic	7440-38-2	14 / 14	46.4	MA-SB29-SS-1.0	9.9	9 / 14	47.7		✓
	Barium	7440-39-3	14 / 14	5070.0	MA-SB78-SS-0.5	283	11 / 14	17.9		✓
	Beryllium	7440-41-7	1 / 14	0.3 J	MA-SO303-SS-1.0	10	0 / 14	0.03		✓
	Cadmium	7440-43-9	5 / 14	5.1	MA-SO302-SS-1.0	4	2 / 14	0.23		✓

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Chemical Group	Chemical Name	CAS No	Frequency of Detection	Maximum		Screening Value	Frequency of Exceedence	HQ ^a	HQ based on	
				Value	SampleID				RL ^b	Detection
	Calcium	7440-70-2	14 / 14	34100.0	MA-SB68-SS-1.0	NSV	0 / 14	--	--	-
	Chromium	7440-47-3	14 / 14	189.0 J	MA-SB75-SS-1.0	0.4	14 / 14	472.5		✓
	Cobalt	7440-48-4	0 / 14	8.3 B	MA-SO301-SS-1.0	20	-- / --	0.4		✓
	Copper	7440-50-8	14 / 14	358.0	MA-SO302-SS-1.0	60	9 / 14	60.0		✓
	Iron	7439-89-6	14 / 14	27600.0	MA-SO302-SS-1.0	18000	3 / 14	15.5		✓
	Lead	7439-92-1	14 / 14	1110.0	MA-SO301-SS-1.0	40.5	13 / 14	27.4		✓
	Magnesium	7439-95-4	9 / 14	3330.0	MA-SB77-SS-1.0	4400	0 / 14	0.8		✓
	Manganese	7439-96-5	14 / 14	488.0 J	MA-SB72-SS-0.5	330	1 / 14	1.5		✓
	Mercury	7439-97-6	13 / 14	1.5	MA-SB75-SS-1.0	0.058	13 / 14	25.9		✓
	Nickel	7440-02-0	2 / 14	10.6	MA-SB78-SS-0.5	30	0 / 14	0.4		✓
	Potassium	7440-09-7	0 / 14	791.0 B	MA-SB78-SS-0.5	NSV	-- / --	--	--	-
	Selenium	7782-49-2	6 / 14	2.5	MA-SO301-SS-1.0	0.21	6 / 14	11.9		✓
	Silver	7440-22-4	6 / 14	2.0 J	MA-SB29-SS-1.0	2	0 / 14	1.0		✓
	Sodium	7440-23-5	3 / 14	1470.0 J	MA-SB75-SS-1.0	NSV	0 / 14	--	--	-
	Tin(II)	7440-28-0	0 / 14	1.3 UJ	MA-SO301-SS-1.0	1	-- / --	3.1		✓
	Vanadium	7440-62-2	14 / 14	33.6	MA-SO302-SS-1.0	2	14 / 14	16.8		✓
	Zinc	7440-66-6	4 / 14	550.0	MA-SB78-SS-0.5	8.5	4 / 14	64.7		✓

Notes:

^aHQ = Hazard Quotient

^bRL = reporting limit

NSV = no screening value

Shaded cells indicate chemicals with Hazard Quotients greater than 1

TABLE 17
Step 2 Screening Statistics for Ground Water - Shallow Monitoring Wells from Round 1 (June 2002)
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No	Frequency of Detection	Maximum		Screening Value	Frequency of Exceedence	HQ ^a	HQ based on	
				Value	SampleID				RL ^b	Detection
SVOCs (ug/L)	Acenaphthene	83-32-9	1 / 18	1.8 J	MA-MW-5S-R1	23	0 / 18	0.1		✓
	Acenaphthylene	208-96-8	0 / 18	300 U	MA-MW-13S-R1	NSV	-- / --	--		
	Acetophenone	98-86-2	0 / 18	300 U	MA-MW-13S-R1	NSV	-- / --	--		
	Anthracene	120-12-7	0 / 18	300 U	MA-MW-13S-R1	0.1	-- / --	3000.0	✓	
	Atrazine	1912-24-9	0 / 18	300 U	MA-MW-13S-R1	NSV	-- / --	--		
	Benzaldehyde	100-52-7	0 / 18	300 U	MA-MW-13S-R1	NSV	-- / --	--		
	Benzo(a)anthracene	56-55-3	0 / 18	300 U	MA-MW-13S-R1	0.027	-- / --	1111111	✓	
	Benzo(a)pyrene	50-32-8	0 / 18	300 U	MA-MW-13S-R1	0.014	-- / --	21428.6	✓	
	Benzo(b)fluoranthene	205-99-2	0 / 18	300 U	MA-MW-13S-R1	NSV	-- / --	--		
	Benzo(g,h,i)perylene	191-24-2	0 / 18	300 U	MA-MW-13S-R1	NSV	-- / --	--		
	Benzo(k)fluoranthene	207-08-9	0 / 18	300 U	MA-MW-13S-R1	NSV	-- / --	--		
	Biphenyl	92-52-4	0 / 18	300 U	MA-MW-13S-R1	NSV	-- / --	--		
	Bromophenyl-4 Phenyl Ether	101-55-3	0 / 18	300 U	MA-MW-13S-R1	NSV	-- / --	--		
	Butylbenzylphthalate	85-68-7	0 / 18	300 U	MA-MW-13S-R1	3	-- / --	100.0	✓	
	Caprolactam	105-60-2	1 / 18	1.5 J	MA-MW-8S-R1	NSV	0 / 18	--		
	Chloroaniline-4	106-47-8	0 / 18	300 U	MA-MW-13S-R1	50	-- / --	6.0	✓	
	Chloronaphthalene-2	91-58-7	0 / 18	300 U	MA-MW-13S-R1	620	-- / --	0.5	✓	
	Chlorophenol-2	95-57-8	0 / 18	300 U	MA-MW-13S-R1	970	-- / --	0.3	✓	
	Chlorophenyl-4 phenyl ether	7005-72-3	0 / 18	300 U	MA-MW-13S-R1	NSV	-- / --	--		
	Chrysene	218-01-9	0 / 18	300 U	MA-MW-13S-R1	NSV	-- / --	--		
	Cresol-4,6-dinitro-ortho	534-52-1	0 / 18	1200 U	MA-MW-13S-R1	NSV	-- / --	--		
	Cresol-o	95-48-7	2 / 18	490	MA-MW-13S-R1	13	1 / 18	37.7		✓
	Cresol-p	106-44-5	3 / 18	1400	MA-MW-13S-R1	NSV	0 / 18	--		
	Cresol-parachloro-meta	59-50-7	0 / 18	300 U	MA-MW-13S-R1	NSV	-- / --	--		
	Dibenzo(a,h)anthracene	53-70-3	0 / 18	300 U	MA-MW-13S-R1	NSV	-- / --	--		
	Dibenzofuran	132-64-9	0 / 18	300 U	MA-MW-13S-R1	3.7	-- / --	81.4	✓	
	Dichlorobenzidine-3,3	91-94-1	0 / 18	300 U	MA-MW-13S-R1	NSV	-- / --	--		
	Dichlorophenol-2,4	120-83-2	0 / 18	300 U	MA-MW-13S-R1	365	-- / --	0.8	✓	
	Dimethylphenol-2,4	105-67-9	1 / 18	1.7 J	MA-MW-15S-R1	2120	0 / 18	<0.01		✓
	Dinitrophenol-2,4	51-28-5	0 / 18	1200 U	MA-MW-13S-R1	150	-- / --	80.0	✓	
	Dinitrotoluene-2,4	121-14-2	0 / 18	300 U	MA-MW-13S-R1	230	-- / --	113	✓	
	Dinitrotoluene-2,6	606-20-2	0 / 18	300 U	MA-MW-13S-R1	NSV	-- / --	--		
	Ether, bis(2-chloroethyl)	111-44-4	2 / 18	7.2	MA-MW-9S-R1	NSV	0 / 18	--		
	Ether, bis-chloroisopropyl	108-60-1	0 / 18	300 U	MA-MW-13S-R1	NSV	-- / --	--		
	Fluoranthene	206-44-0	1 / 18	3.3 J	MA-MW-5S-R1	6.2	0 / 18	0.5		✓
	Fluorene	86-73-7	1 / 18	1.7 J	MA-MW-5S-R1	3.9	0 / 18	0.4		✓
	Hexachlorobenzene	118-74-1	0 / 18	300 U	MA-MW-13S-R1	3.68	-- / --	81.5	✓	
	Hexachlorobutadiene	87-68-3	0 / 18	300 U	MA-MW-13S-R1	9.3	-- / --	32.3	✓	
	Hexachlorocyclopentadiene	77-47-4	0 / 18	300 U	MA-MW-13S-R1	5.2	-- / --	57.7	✓	
	Hexachloroethane	67-72-1	0 / 18	300 U	MA-MW-13S-R1	540	-- / --	0.6	✓	
	Indeno(1,2,3-cd)pyrene	193-39-5	0 / 18	300 U	MA-MW-13S-R1	NSV	-- / --	--		
	Isophorone	78-59-1	0 / 18	300 U	MA-MW-13S-R1	117000	-- / --	<0.01		✓
	Methane, bis(2-chloroethoxy)	111-91-1	0 / 18	300 U	MA-MW-13S-R1	11000	-- / --	0.03		✓
	Methylnaphthalene-2	91-57-6	2 / 18	1.8 J	MA-MW-5S-R1	NSV	0 / 18	--		
	Naphthalene	91-20-3	3 / 18	2600	MA-MW-13S-R1	12	3 / 18	216.7		✓
	Nitroaniline-2	88-74-4	0 / 18	1200 U	MA-MW-13S-R1	NSV	-- / --	--		
	Nitroaniline-3	99-09-2	0 / 18	1200 U	MA-MW-13S-R1	NSV	-- / --	--		
	Nitroaniline-4	100-01-6	0 / 18	1200 U	MA-MW-13S-R1	NSV	-- / --	--		
	Nitrobenzene	98-95-3	0 / 18	300 U	MA-MW-13S-R1	27000	-- / --	0.01		✓

TABLE 17
Step 2 Screening Statistics for Ground Water - Shallow Monitoring Wells from Round 1 (June 2002)
Martin Aáron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No	Frequency of Detection	Maximum		Screening Value	Frequency of Exceedence	HQ ^a	HQ based on	
				Value	SampleID				RL ^b	Detection
Organic Compounds	Nitrophenol-2	88-75-5	0 / 18	300 U	MA-MW-13S-R1	300	-- / --	100	✓	
	Nitrophenol-4	100-02-7	0 / 18	1200 U	MA-MW-13S-R1	150	-- / --	80	✓	
	Nitroso-di-n-propyl-amine-N	621-64-7	0 / 18	300 U	MA-MW-13S-R1	NSV	-- / --	-	-	-
	Nitrosodiphenylamine-n	86-30-6	4 / 18	70 J	MA-MW-13S-R1	210	0 / 18	0.3		✓
	PCP (Pentachlorophenol)	87-86-5	0 / 18	300 U	MA-MW-13S-R1	15	-- / --	200	✓	
	Phenanthrene	85-01-8	1 / 18	10	MA-MW-5S-R1	6.3	1 / 18	116		✓
	Phenol	108-95-2	3 / 18	7200	MA-MW-13S-R1	110	1 / 18	6515		✓
	Phthalate, bis(2-ethylhexyl)(DEHP)	117-81-7	0 / 18	300 U	MA-MW-13S-R1	0.12	-- / --	25000	✓	
	Phthalate, di-n-butyl	84-74-2	0 / 18	300 U	MA-MW-13S-R1	1	-- / --	3000	✓	
	Phthalate, di-n-octyl	117-84-0	0 / 18	300 U	MA-MW-13S-R1	3	-- / --	1000	✓	
	Phthalate, diethyl	84-66-2	1 / 18	2.5 J	MA-MW-16S-R1	210	0 / 18	0.01		✓
	Phthalate, dimethyl	131-11-3	0 / 18	300 U	MA-MW-13S-R1	3	-- / --	1000	✓	
	Pyrene	129-00-0	1 / 18	3.3 J	MA-MW-5S-R1	NSV	0 / 18	-	-	-
	Tetrachlorobenzene, 1,2,4,5-	95-94-3	0 / 18	300 U	MA-MW-13S-R1	50	-- / --	60	✓	
	Trichlorophenol, 2,4,5-	95-95-4	0 / 18	1200 U	MA-MW-13S-R1	63	-- / --	190	✓	
	Trichlorophenol-2,4,6	88-06-2	0 / 18	300 U	MA-MW-13S-R1	970	-- / --	0.3	✓	
Pesticides/PCBs (ug/L)	Aldrin	309-00-2	0 / 18	0.01 UJ	MA-MW-1S-R1	3	-- / --	<0.01	✓	
	BHC, alpha	319-84-6	0 / 18	0.01 UJ	MA-MW-1S-R1	100	-- / --	<0.01	✓	
	BHC, beta	319-85-7	0 / 18	0.01 UJ	MA-MW-1S-R1	NSV	-- / --	-	-	-
	BHC, delta	319-86-8	1 / 18	0.014 J	MA-MW-15S-R1	100	0 / 18	<0.01		✓
	BHC, gamma (Lindane)	58-89-9	1 / 18	0.03 NJ	MA-MW-15S-R1	0.08	0 / 18	0.4	✓	
	Chlordane - alpha	5103-71-9	3 / 18	0.15	MA-MW-14S-R1	0.0043	3 / 18	349		✓
	Chlordane - gamma (technical mixture)	12789-03-6	2 / 18	0.091 J	MA-MW-14S-R1	NSV	0 / 18	-	-	-
	DDD-4,4	72-54-8	0 / 18	0.02 U	MA-MW-1S-R1	0.6	-- / --	0.03	✓	
	DDE-4,4	72-55-9	2 / 18	0.039 J	MA-MW-12S-R1	1050	0 / 18	<0.01		✓
	DDT-4,4	50-29-3	1 / 18	0.022 NJ	MA-MW-12S-R1	0.001	1 / 18	220		✓
	Dieleadrin	60-57-1	3 / 18	0.099 J	MA-MW-12S-R1	0.0019	3 / 18	52		✓
	Endosulfan I (alpha)	959-98-8	0 / 18	0.01 U	MA-MW-1S-R1	0.056	-- / --	0.2	✓	
	Endosulfan II (beta)	33213-65-9	0 / 18	0.02 U	MA-MW-1S-R1	0.056	-- / --	0.4	✓	
	Endosulfan Sulfate	1031-07-8	0 / 18	0.02 U	MA-MW-1S-R1	0.056	-- / --	0.4	✓	
	Endrin	72-20-8	0 / 18	0.02 U	MA-MW-1S-R1	0.0023	-- / --	87	✓	
	Endrin/Aldehyde	7421-93-4	0 / 18	0.02 U	MA-MW-1S-R1	0.0023	-- / --	87	✓	
	Endrin/ketone	53494-70-5	0 / 18	0.02 U	MA-MW-1S-R1	0.0023	-- / --	87	✓	
	Heptachlor	76-44-8	0 / 18	0.01 UJ	MA-MW-1S-R1	0.0038	-- / --	276	✓	
	Heptachlor/Epoxyde	1024-57-3	1 / 18	0.055 J	MA-MW-13S-R1	0.0038	1 / 18	145		✓
	Methoxychlor	72-43-5	0 / 18	0.1 U	MA-MW-1S-R1	0.03	-- / --	33	✓	
	Pcb-araclor 1016	12674-11-2	0 / 18	0.2 U	MA-MW-1S-R1	0.000244	-- / --	8197	✓	
	Pcb-araclor 1221	11104-28-2	0 / 18	0.4 U	MA-MW-1S-R1	0.000244	-- / --	16393		-
	Pcb-araclor 1232	11141-16-5	0 / 18	0.2 U	MA-MW-1S-R1	0.000244	-- / --	8197	✓	
	Pcb-araclor 1242	53469-21-9	0 / 18	0.2 U	MA-MW-1S-R1	0.000244	-- / --	8197	✓	
	Pcb-araclor 1248	12672-29-6	0 / 18	0.2 U	MA-MW-1S-R1	0.000244	-- / --	8197	✓	
	Pcb-araclor 1254	11097-69-1	0 / 18	0.2 U	MA-MW-1S-R1	0.000244	-- / --	8197	✓	
	Pcb-araclor 1260	11096-82-5	0 / 18	0.2 U	MA-MW-1S-R1	NSV	-- / --	-	-	-
	Toxaphene	8001-35-2	0 / 18	1 U	MA-MW-1S-R1	0.0002	-- / --	50000	✓	
VOCs (ug/L)	Acetone	67-64-1	1 / 18	16 J	MA-MW-5S-R1	1500	0 / 18	0.01		✓
	Benzene	71-43-2	7 / 18	150 J	MA-MW-5S-R1	130	1 / 18	12		✓
	Bromoform	75-25-2	1 / 18	0.64 J	MA-MW-9S-R1	NSV	0 / 18	--	-	-
	Bromomethane	74-83-9	0 / 18	0.5 UJ	MA-MW-1S-R1	NSV	-- / --	--	-	-
	Carbon disulfide	75-15-0	2 / 18	19 J	MA-MW-13S-R1	0.92	1 / 18	207		✓

TABLE 17
Step 2 Screening Statistics for Ground Water - Shallow Monitoring Wells from Round 1 (June 2002)
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No	Frequency of Detection	Maximum		Screening Value	Frequency of Exceedence	HQ ^a	HQ based on	
				Value	SampleID				RL ^b	Detection
	Carbon tetrachloride	56-23-5	0 / 18	0.5 UJ	MA-MW-1S-R1	9.8	-- / --	0.1	✓	
	Chlorobenzene	108-90-7	3 / 18	2.3 J	MA-MW-5S-R1	64	0 / 18	0.04		✓
	Chlorobromomethane	74-97-5	0 / 18	0.5 UJ	MA-MW-1S-R1	11000	-- / --	< 0.01	✓	
	Chloroethane	75-00-3	3 / 18	5.3 J	MA-MW-16S-R1	NSV	0 / 18	--	--	--
	Chloroform	67-66-3	0 / 18	0.5 UJ	MA-MW-1S-R1	28	-- / --	0.02	✓	
	Chloromethane	74-87-3	0 / 18	0.5 UJ	MA-MW-1S-R1	NSV	-- / --	--	--	--
	Cyclohexane	110-82-7	4 / 18	53 J	MA-MW-5S-R1	NSV	0 / 18	--	--	--
	DBCP (1,2-dibromo-3-chloropropane)	96-12-8	0 / 18	0.5 UJ	MA-MW-1S-R1	NSV	-- / --	--	--	--
	Dibromochloromethane	124-48-1	0 / 18	0.5 UJ	MA-MW-1S-R1	11000	-- / --	< 0.01	✓	
	Dibromoethane-1,2	106-93-4	0 / 18	0.5 UJ	MA-MW-1S-R1	18000	-- / --	< 0.01	✓	
	Dichlorobenzene-1,2	95-50-1	4 / 18	14 J	MA-MW-13S-R1	14	1 / 18	1.0		✓
	Dichlorobenzene-1,3	541-73-1	0 / 18	0.5 U	MA-MW-4S-R1	71	-- / --	0.01	✓	
	Dichlorobenzene-1,4	106-46-7	1 / 18	1.8 J	MA-MW-12S-R1	15	0 / 18	0.1		✓
	Dichlorobromomethane	75-27-4	0 / 18	0.5 UJ	MA-MW-1S-R1	11000	-- / --	< 0.01	✓	
	Dichlorodifluoromethane	75-71-8	0 / 18	0.5 UJ	MA-MW-1S-R1	11000	-- / --	< 0.01	✓	
	Dichloroethane-1,1	75-34-3	7 / 18	120 J	MA-MW-16S-R1	47	1 / 18	2.6		✓
	Dichloroethane-1,2	107-06-2	1 / 18	1.5 J	MA-MW-15S-R1	20000	0 / 18	< 0.01		✓
	Dichloroethylene-1,2 trans	156-60-5	4 / 18	15	MA-MW-14S-R1	11600	0 / 18	< 0.01		✓
	Dichloroethylene-1,1	75-35-4	0 / 18	0.5 UJ	MA-MW-1S-R1	25	-- / --	0.02	✓	
	Dichloroethylene-1,2 cis	156-59-2	8 / 18	320	MA-MW-14S-R1	116000	0 / 18	< 0.01		✓
	Dichloropropane-1,2	78-87-5	1 / 18	1.2 J	MA-MW-9S-R1	5700	0 / 18	< 0.01		✓
	Dichloropropene-1,3 cis	10061-01-5	0 / 18	0.5 UJ	MA-MW-1S-R1	244	-- / --	< 0.01	✓	
	Dichloropropene-1,3 trans	10061-02-6	0 / 18	0.5 UJ	MA-MW-1S-R1	244	-- / --	< 0.01	✓	
	Ethylbenzene	100-41-4	5 / 18	45 J	MA-MW-13S-R1	7.3	3 / 18	6.2		✓
	Freon 113 (1,1,2-trichloro-1,2,2-trifluoroethane)	76-13-1	0 / 18	0.5 UJ	MA-MW-1S-R1	NSV	-- / --	--	--	--
	Hexanone-2	591-78-6	0 / 18	5 UJ	MA-MW-4S-R1	99	-- / --	0.1	✓	
	Isopropylbenzene	98-82-8	4 / 18	13 J	MA-MW-5S-R1	NSV	0 / 18	--	--	--
	Methyl acetate	79-20-9	0 / 18	0.5 UJ	MA-MW-1S-R1	NSV	-- / --	--	--	--
	Methyl cyclohexane	108-87-2	5 / 18	200 J	MA-MW-5S-R1	NSV	0 / 18	--	--	--
	Methyl ethyl ketone (2-butanone)	78-93-3	1 / 18	180 J	MA-MW-13S-R1	14000	0 / 18	0.01		✓
	Methyl isobutyl ketone (4-methyl-2-pentanone)	108-10-1	1 / 18	240 J	MA-MW-13S-R1	170	1 / 18	1.4		✓
	Methyl tertiary butyl ether (MTBE)	1634-04-4	8 / 18	11 J	MA-MW-5S-R1	NSV	0 / 18	--	--	--
	Methylene chloride	75-09-2	0 / 18	0.5 UJ	MA-MW-1S-R1	2200	-- / --	< 0.01	✓	
	Styrene	100-42-5	0 / 18	0.5 U	MA-MW-4S-R1	NSV	-- / --	--	--	--
	Tetrachloroethane-1,1,2,2	79-34-5	0 / 18	0.5 UJ	MA-MW-1S-R1	610	-- / --	< 0.01	✓	
	Tetrachloroethylene	127-18-4	3 / 18	0.86 J	MA-MW-9S-R1	98	0 / 18	0.01		✓
	Toluene	108-88-3	6 / 18	17 J	MA-MW-13S-R1	9.8	1 / 18	1.7		✓
	Trichlorobenzene-1,2,3	87-61-6	2 / 18	3.3 J	MA-MW-13S-R1	50	0 / 18	0.1		✓
	Trichlorobenzene-1,2,4	120-82-1	3 / 18	11 J	MA-MW-13S-R1	110	0 / 18	0.1		✓
	Trichloroethane-1,1,1	71-55-6	3 / 18	87 J	MA-MW-16S-R1	11	2 / 18	7.9		✓
	Trichloroethane-1,1,2	79-00-5	0 / 18	0.5 UJ	MA-MW-1S-R1	1200	-- / --	< 0.01	✓	
	Trichloroethylene	79-01-6	8 / 18	8.1	MA-MW-14S-R1	470	0 / 18	0.02		✓
	Trichlorofluoromethane	75-69-4	0 / 18	0.5 UJ	MA-MW-1S-R1	11000	-- / --	< 0.01	✓	
	Vinyl chloride	75-01-4	4 / 18	58 J	MA-MW-12S-R1	782	0 / 18	0.1		✓
	Xylenes total	1330-20-7	5 / 18	90 J	MA-MW-5S-R1	13	2 / 18	6.9		✓
Total Inorganics (ug/L)	Aluminum	7429-90-5	15 / 18	36000	MA-MW-22S-R1	87	15 / 18	4138		✓
	Antimony	7440-36-0	1 / 18	19	MA-MW-1S-R1	30	0 / 18	0.6		✓
	Arsenic	7440-38-2	13 / 18	6400	MA-MW-13S-R1	150	6 / 18	4273		✓
	Barium	7440-39-3	18 / 18	26000	MA-MW-13S-R1	4	18 / 18	65000		✓

TABLE 17
Step 2 Screening Statistics for Ground Water - Shallow Monitoring Wells from Round 1 (June 2002)
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No	Frequency of Detection	Maximum		Screening Value	Frequency of Exceedence	HQ ^a	HQ based on	
				Value	SampleID				RL ^b	Detection
	Beryllium	7440-41-7	0 / 18	5 U	MA-MW-1S-R1	0.66	-- / --	7.6	✓	
	Cadmium	7440-43-9	1 / 18	14	MA-MW-17S-R1	2.2	1 / 18	6.4	✓	
	Calcium	7440-70-2	18 / 18	890	MA-MW-13S-R1	NSV	0 / 18	--	--	--
	Chromium	7440-47-3	10 / 18	110	MA-MW-22S-R1	11	6 / 18	10.0	✓	
	Cobalt	7440-48-4	6 / 18	32	MA-MW-15S-R1	23	2 / 18	11.4	✓	
	Copper	7440-50-8	7 / 18	140	MA-MW-22S-R1	9	7 / 18	15.6	✓	
	Cyanide	57-12-5	0 / 18	1.8 B**	MA-MW-4S-R1	5.2	-- / --	0.3	✓	
	Iron	7439-89-6	18 / 18	70000	MA-MW-13S-R1	1000	16 / 18	70.0	✓	
	Lead	7439-92-1	2 / 18	630	MA-MW-22S-R1	2.5	2 / 18	252.0	✓	
	Magnesium	7439-95-4	18 / 18	240	MA-MW-5S-R1	NSV	0 / 18	--	--	--
	Manganese	7439-96-5	18 / 18	1700	MA-MW-15S-R1	120	14 / 18	14.2	✓	
	Mercury	7439-97-6	3 / 18	0.18	MA-MW-22S-R1	0.77	0 / 18	0.2	✓	
	Nickel	7440-02-0	11 / 18	61	MA-MW-22S-R1	52	1 / 18	11.2	✓	
	Potassium	7440-09-7	18 / 18	53	MA-MW-13S-R1	NSV	0 / 18	--	--	--
	Selenium	7782-49-2	3 / 18	17	MA-MW-20S-R1	5	3 / 18	3.4	✓	
	Silver	7440-22-4	0 / 18	6 U	MA-MW-1S-R1	0.36	-- / --	16.7	✓	
	Sodium	7440-23-5	18 / 18	150	MA-MW-5S-R1	NSV	0 / 18	--	--	--
	Thallium	7440-28-0	0 / 18	20 U	MA-MW-1S-R1	40	-- / --	0.5	✓	
	Vanadium	7440-62-2	4 / 18	87	MA-MW-22S-R1	20	3 / 18	4.4	✓	
	Zinc	7440-66-6	15 / 18	2900	MA-MW-17S-R1	120	7 / 18	24.2	✓	

Notes:

^aHQ = Hazard Quotient

^bRL = reporting limit

NSV = no screening value

Shaded cells indicated chemicals with Hazard Quotients greater than 1

TABLE 18
Step 2 Summary Statistics for Ground Water - Shallow Monitoring Wells from Round 2 (September 2002)
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No	Frequency of Detection	Maximum		Screening Value	Frequency of Exceedence	HQ ^a	HQ based on	
				Value	SampleID				RL ^b	Detection
SVOCs (ug/L)	Acenaphthene	83-32-9	0 / 16	5 U	MA-MW-1S-R2	23	-- / --	0.2	✓	
	Acenaphthylene	208-96-8	0 / 16	5 U	MA-MW-1S-R2	NSV	-- / --	--		
	Acetophenone	98-86-2	0 / 16	5 U	MA-MW-1S-R2	NSV	-- / --	--		
	Anthracene	120-12-7	0 / 16	5 U	MA-MW-1S-R2	0.1	-- / --	50.0	✓	
	Atrazine	1912-24-9	0 / 16	5 UJ	MA-MW-1S-R2	NSV	-- / --	--		
	Benzaldehyde	100-52-7	0 / 16	5 U	MA-MW-1S-R2	NSV	-- / --	--		
	Benzo(a)anthracene	56-55-3	0 / 16	5 U	MA-MW-1S-R2	0.027	-- / --	185.2	✓	
	Benzo(a)pyrene	50-32-8	0 / 16	5 U	MA-MW-1S-R2	0.014	-- / --	357.1	✓	
	Benzo(b)fluoranthene	205-99-2	0 / 16	5 U	MA-MW-1S-R2	NSV	-- / --	--		
	Benzo(g,h,i)perylene	191-24-2	0 / 16	5 U	MA-MW-1S-R2	NSV	-- / --	--		
	Benzo(k)fluoranthene	207-08-9	0 / 16	5 U	MA-MW-1S-R2	NSV	-- / --	--		
	Biphenyl	92-52-4	0 / 16	5 U	MA-MW-1S-R2	NSV	-- / --	--		
	Bromophenyl-4 Phenyl Ether	101-55-3	0 / 16	5 U	MA-MW-1S-R2	NSV	-- / --	--		
	Butylbenzyl phthalate	85-68-7	1 / 16	1.3 J	MA-MW-14S-R2	3	0 / 16	0.4		✓
	Caprolactam	105-60-2	2 / 16	3.2 J	MA-MW-22S-R2	NSV	0 / 16	--		
	Chloroaniline-4	106-47-8	0 / 16	5 U	MA-MW-1S-R2	50	-- / --	0.1	✓	
	Chloronaphthalene-2	91-58-7	0 / 16	5 U	MA-MW-1S-R2	620	-- / --	0.01	✓	
	Chlorophenol-2	95-57-8	0 / 16	5 U	MA-MW-1S-R2	970	-- / --	0.01	✓	
	Chlorophenyl-4 phenyl ether	7005-72-3	0 / 16	5 U	MA-MW-1S-R2	NSV	-- / --	--		
	Chrysene	218-01-9	0 / 16	5 U	MA-MW-1S-R2	NSV	-- / --	--		
	Cresol-4,6-dinitro-ortho	534-52-1	0 / 16	20 UJ	MA-MW-1S-R2	NSV	-- / --	--		
	Cresol-o	95-48-7	1 / 16	1.4 J	MA-MW-16S-R2	13	0 / 16	0.1		✓
	Cresol-p	106-44-5	2 / 16	2.2 J	MA-MW-1S-R2	NSV	0 / 16	--		
	Cresol-parachloro-meta	59-50-7	0 / 16	5 U	MA-MW-1S-R2	NSV	-- / --	--		
	Dibenzo(a,h)anthracene	53-70-3	0 / 16	5 U	MA-MW-1S-R2	NSV	-- / --	--		
	Dibenzofuran	132-64-9	0 / 16	5 U	MA-MW-1S-R2	3.7	-- / --	12.4	✓	
	Dichlorobenzidine-3,3	91-94-1	0 / 16	5 UJ	MA-MW-1S-R2	NSV	-- / --	--		
	Dichlorophenol-2,4	120-83-2	0 / 16	5 U	MA-MW-1S-R2	365	-- / --	0.01	✓	
	Dimethylphenol-2,4	105-67-9	1 / 16	1.2 J	MA-MW-16S-R2	2120	0 / 16	<0.01		✓
	Dinitropheno-2,4	51-28-5	0 / 16	20 U	MA-MW-1S-R2	150	-- / --	0.1	✓	
	Dinitrotoluene-2,4	121-14-2	0 / 16	5 U	MA-MW-1S-R2	230	-- / --	0.02	✓	
	Dinitrotoluene-2,6	606-20-2	0 / 16	5 U	MA-MW-1S-R2	NSV	-- / --	--		
	Ether, bis(2-chloroethyl)	111-44-4	2 / 16	15	MA-MW-9S-R2	NSV	0 / 16	--		
	Ether, bis-chloroisopropyl	108-60-1	0 / 16	5 U	MA-MW-1S-R2	NSV	-- / --	--		
	Fluoranthene	206-44-0	0 / 16	5 U	MA-MW-1S-R2	6.2	-- / --	0.8	✓	
	Fluorene	86-73-7	1 / 16	1.1 J	MA-MW-5S-R2	3.9	0 / 16	0.3		✓
	Hexachlorobenzene	118-74-1	0 / 16	5 U	MA-MW-1S-R2	3.68	-- / --	12.4	✓	
	Hexachlorobutadiene	87-68-3	0 / 16	5 U	MA-MW-1S-R2	9.3	-- / --	0.5	✓	
	Hexachlorocyclopentadiene	77-47-4	0 / 16	5 U	MA-MW-1S-R2	5.2	-- / --	11.0	✓	
	Hexachloroethane	67-72-1	0 / 16	5 U	MA-MW-1S-R2	540	-- / --	0.01	✓	
	Indeno(1,2,3-cd)pyrene	193-39-5	0 / 16	5 U	MA-MW-1S-R2	NSV	-- / --	--		
	Isophorone	78-59-1	1 / 16	3.2 J	MA-MW-9S-R2	117000	0 / 16	<0.01		✓
	Methane, bis(2-chloroethoxy)	111-91-1	0 / 16	5 U	MA-MW-1S-R2	11000	-- / --	<0.01	✓	
	Methylnaphthalene-2	91-57-6	2 / 16	4 J	MA-MW-5S-R2	NSV	0 / 16	--		
	Naphthalene	91-20-3	3 / 16	170	MA-MW-16S-R2	12	2 / 16	14.2		✓
	Nitroaniline-2	88-74-4	0 / 16	20 U	MA-MW-1S-R2	NSV	-- / --	--		
	Nitroaniline-3	99-09-2	0 / 16	20 U	MA-MW-1S-R2	NSV	-- / --	--		
	Nitroaniline-4	100-01-6	0 / 16	20 U	MA-MW-1S-R2	NSV	-- / --	--		
	Nitrobenzene	98-95-3	0 / 16	5 U	MA-MW-1S-R2	27000	-- / --	<0.01	✓	

TABLE 18
Step 2 Summary Statistics for Ground Water - Shallow Monitoring Wells from Round 2 (September 2002)
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No	Frequency of Detection	Maximum		Screening Value	Frequency of Exceedence	HQ ^a	HQ based on	
				Value	SampleID				RL ^b	Detection
Organic Compounds	Nitrophenol-2	88-75-5	0 / 16	5 U	MA-MW-1S-R2	300	-- / --	0.02	✓	
	Nitrophenol-4	100-02-7	0 / 16	20 U	MA-MW-1S-R2	150	-- / --	0.1	✓	
	Nitroso-di-n-propyl-amine-N	621-64-7	0 / 16	5 U	MA-MW-1S-R2	NSV	-- / --	--	--	--
	Nitrosodiphenylamine-n	86-30-6	3 / 16	.38	MA-MW-1S-R2	210	0 / 16	0.2		✓
	PCP (Pentachlorophenol)	87-86-5	0 / 16	5 U	MA-MW-1S-R2	15	-- / --	0.3	✓	
	Phenanthrene	85-01-8	1 / 16	2.2 J	MA-MW-5S-R2	6.3	0 / 16	0.3		✓
	Phenol	108-95-2	1 / 16	2.4 J	MA-MW-5S-R2	110	0 / 16	0.02		✓
	Phthalate, bis(2-ethylhexyl) (DEHP)	117-81-7	3 / 16	2.6 J	MA-MW-9S-R2	0.12	3 / 16	21.7		✓
	Phthalate, di-n-butyl	84-74-2	2 / 16	1.3 J	MA-MW-14S-R2	1	2 / 16	1.3		✓
	Phthalate, di-n-octyl	117-84-0	0 / 16	5 U	MA-MW-1S-R2	3	-- / --	1.7		✓
	Phthalate, diethyl	84-66-2	0 / 16	5 U	MA-MW-1S-R2	210	-- / --	0.02		✓
	Phthalate, dimethyl	131-11-3	0 / 16	5 U	MA-MW-1S-R2	3	-- / --	1.7		✓
	Pyrene	129-00-0	0 / 16	5 U	MA-MW-1S-R2	NSV	-- / --	--	--	--
	Tetrachlorobenzene-1,2,4,5	95-94-3	0 / 16	5 U	MA-MW-1S-R2	50	-- / --	0.1		✓
	Trichlorophenol-2,4,5	95-95-4	0 / 16	20 U	MA-MW-1S-R2	63	-- / --	0.3		✓
	Trichlorophenol-2,4,6	88-06-2	0 / 16	5 U	MA-MW-1S-R2	970	-- / --	0.01		✓
Pesticides/PCBs (ug/L)	Aldrin	309-00-2	0 / 18	0.01 U	MA-MW-1S-R2	3	-- / --	< 0.01	✓	
	BHC, alpha	319-84-6	0 / 18	0.01 U	MA-MW-1S-R2	100	-- / --	< 0.01	✓	
	BHC, beta	319-85-7	0 / 18	0.01 U	MA-MW-1S-R2	NSV	-- / --	--	--	--
	BHC, delta	319-86-8	0 / 18	0.01 U	MA-MW-1S-R2	100	-- / --	< 0.01	✓	
	BHC, gamma (Lindane)	58-89-9	0 / 18	0.01 U	MA-MW-1S-R2	0.08	-- / --	0.1	✓	
	Chlordane - alpha	5103-71-9	0 / 18	0.01 U	MA-MW-1S-R2	0.0043	-- / --	2.3		✓
	Chlordane - gamma (technical mixture)	12789-03-6	0 / 18	0.01 U	MA-MW-1S-R2	NSV	-- / --	--	--	--
	DDD-4,4	72-54-8	0 / 18	0.02 U	MA-MW-1S-R2	0.6	-- / --	0.03	✓	
	DDE-4,4	72-55-9	0 / 18	0.02 U	MA-MW-1S-R2	1050	-- / --	< 0.01	✓	
	DDT-4,4	50-29-3	0 / 18	0.02 U	MA-MW-1S-R2	0.001	-- / --	20.0		✓
	Dieldrin	60-57-1	1 / 18	0.064 NJ	MA-MW-14S-R2	0.0019	1 / 18	33.7		✓
	Endosulfan I (alpha)	959-98-8	0 / 18	0.01 U	MA-MW-1S-R2	0.056	-- / --	0.2	✓	
	Endosulfan II (beta)	33213-65-9	0 / 18	0.02 U	MA-MW-1S-R2	0.056	-- / --	0.4	✓	
	Endosulfan Sulfate	1031-07-8	0 / 18	0.02 U	MA-MW-1S-R2	0.056	-- / --	0.4	✓	
	Endrin	72-20-8	0 / 18	0.02 U	MA-MW-1S-R2	0.0023	-- / --	8.7		✓
	Endrin/Aldehyde	7421-93-4	0 / 18	0.02 U	MA-MW-1S-R2	0.0023	-- / --	8.7		✓
	Endrin/ketone	53494-70-5	0 / 18	0.02 U	MA-MW-1S-R2	0.0023	-- / --	8.7		✓
	Heptachlor	76-44-8	0 / 18	0.01 U	MA-MW-1S-R2	0.0038	-- / --	2.6		✓
	Heptachlor-Epoxide	1024-57-3	0 / 18	0.01 U	MA-MW-1S-R2	0.0038	-- / --	2.6		✓
	Methoxychlor	72-43-5	0 / 18	0.1 U	MA-MW-1S-R2	0.03	-- / --	3.0		✓
	Pcb-araclor 1016	12674-11-2	0 / 18	0.2 U	MA-MW-1S-R2	0.000244	-- / --	819.7		✓
	Pcb-araclor 1221	11104-28-2	0 / 18	0.4 U	MA-MW-1S-R2	0.000244	-- / --	1639.3		✓
	Pcb-araclor 1232	11141-16-5	0 / 18	0.2 U	MA-MW-1S-R2	0.000244	-- / --	819.7		✓
	Pcb-araclor 1242	53469-21-9	0 / 18	0.2 U	MA-MW-1S-R2	0.000244	-- / --	819.7		✓
	Pcb-araclor 1248	12672-29-6	0 / 18	0.2 U	MA-MW-1S-R2	0.000244	-- / --	819.7		✓
	Pcb-araclor 1254	11097-69-1	0 / 18	0.2 U	MA-MW-1S-R2	0.000244	-- / --	819.7		✓
	Pcb-araclor 1260	11096-82-5	0 / 18	0.2 U	MA-MW-1S-R2	NSV	-- / --	--	--	--
	Toxaphene	80001-35-2	0 / 18	1 U	MA-MW-1S-R2	0.0002	-- / --	5000.0		✓
VOCs (ug/L)	Acetone	67-64-1	2 / 18	44 J	MA-MW-13S-R2	1500	0 / 18	0.03		✓
	Benzene	71-43-2	10 / 18	110	MA-MW-5S-R2	130	0 / 18	0.8		✓
	Bromoform	75-25-2	4 / 18	0.93 J	MA-MW-21S-R2	NSV	0 / 18	--	--	--
	Bromomethane	74-83-9	1 / 18	0.15 J	MA-MW-22S-R2	NSV	0 / 18	--	--	--
	Carbon disulfide	75-15-0	5 / 18	0.6	MA-MW-15S-R2	0.92	0 / 18	0.7		✓

TABLE 18
Step 2 Summary Statistics for Ground Water - Shallow Monitoring Wells from Round 2 (September 2002)
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No	Frequency of Detection	Maximum		Screening Value	Frequency of Exceedence	HQ ^a	HQ based on	
				Value	SampleID				RL ^b	Detection
	Carbon tetrachloride	56-23-5	0 / 18	10 U	MA-MW-5S-R2	9.8	-- / --	1.0	✓	
	Chlorobenzene	108-90-7	4 / 18	1.3	MA-MW-15S-R2	64	0 / 18	0.02		✓
	Chlorobromomethane	74-97-5	0 / 18	10 U	MA-MW-5S-R2	11000	-- / --	< 0.01	✓	
	Chloroethane	75-00-3	1 / 18	3	MA-MW-15S-R2	NSV	0 / 18	--	-	-
	Chloroform	67-66-3	2 / 18	1.3 J	MA-MW-22S-R2	28	0 / 18	0.05		✓
	Chloromethane	74-87-3	0 / 18	10 U	MA-MW-5S-R2	NSV	-- / --	--	-	-
	Cyclohexane	110-82-7	7 / 18	28	MA-MW-5S-R2	NSV	0 / 18	--	-	-
	DBCP (1,2-dibromo-3-chloropropane)	96-12-8	0 / 18	10 U	MA-MW-5S-R2	NSV	-- / --	--	-	-
	Dibromochloromethane	124-48-1	0 / 18	10 U	MA-MW-5S-R2	11000	-- / --	< 0.01	✓	
	Dibromoethane-1,2	106-93-4	0 / 18	10 U	MA-MW-5S-R2	18000	-- / --	< 0.01	✓	
	Dichlorobenzene-1,2	95-50-1	5 / 18	6	MA-MW-12S-R2	14	0 / 18	0.4		✓
	Dichlorobenzene-1,3	541-73-1	2 / 18	0.66	MA-MW-12S-R2	71	0 / 18	0.01		✓
	Dichlorobenzene-1,4	106-46-7	5 / 18	1.5	MA-MW-12S-R2	15	0 / 18	0.1		✓
	Dichlorobromomethane	75-27-4	0 / 18	10 U	MA-MW-5S-R2	11000	-- / --	< 0.01	✓	
	Dichlorodifluoromethane	75-71-8	0 / 18	10 U	MA-MW-5S-R2	11000	-- / --	< 0.01	✓	
	Dichloroethane-1,1	75-34-3	9 / 18	41	MA-MW-16S-R2	47	0 / 18	0.9		✓
	Dichloroethane-1,2	107-06-2	2 / 18	3.5	MA-MW-16S-R2	20000	0 / 18	< 0.01		✓
	Dichloroethylene-1,2 trans	156-60-5	5 / 18	21	MA-MW-14S-R2	11600	0 / 18	< 0.01		✓
	Dichloroethylene-1,1	75-35-4	3 / 18	0.54	MA-MW-14S-R2	25	0 / 18	0.02		✓
	Dichloroethylene-1,2 cis	156-59-2	12 / 18	380	MA-MW-14S-R2	116000	0 / 18	< 0.01		✓
	Dichloropropane-1,2	78-87-5	1 / 18	0.64	MA-MW-9S-R2	5700	0 / 18	< 0.01		✓
	Dichloropropene-1,3 cis	10061-01-5	1 / 18	0.21 J	MA-MW-18S-R2	244	0 / 18	< 0.01		✓
	Dichloropropene-1,3 trans	10061-02-6	0 / 18	10 U	MA-MW-5S-R2	244	-- / --	0.04	✓	
	Ethylbenzene	100-41-4	8 / 18	26	MA-MW-5S-R2	7.3	1 / 18	3.0		✓
	Freon 113 (1,1,2-trichloro-1,2,2-trifluoroethane)	76-13-1	0 / 18	10 U	MA-MW-5S-R2	NSV	-- / --	--	-	-
	Hexanone-2	591-78-6	1 / 18	0.24 J	MA-MW-1S-R2	99	0 / 18	< 0.01		✓
	Isopropylbenzene	98-82-8	5 / 18	5.8 J	MA-MW-5S-R2	NSV	0 / 18	--	-	-
	Methyl acetate	79-20-9	1 / 18	0.29 J	MA-MW-10S-R2	NSV	0 / 18	--	-	-
	Methyl cyclohexane	108-87-2	5 / 18	180	MA-MW-5S-R2	NSV	0 / 18	--	-	-
	Methyl ethyl ketone (2-butanone)	78-93-3	4 / 18	7.2 J	MA-MW-13S-R2	14000	0 / 18	< 0.01		✓
	Methyl isobutyl ketone (4-methyl-2-pentanone)	108-10-1	1 / 18	6.2 J	MA-MW-13S-R2	170	0 / 18	0.04		✓
	Methyl tertiary butyl ether (MTBE)	1634-04-4	11 / 18	5.6	MA-MW-1S-R2	NSV	0 / 18	--	-	-
	Methylene chloride	75-09-2	0 / 18	10 U	MA-MW-5S-R2	2200	-- / --	< 0.01	✓	
	Styrene	100-42-5	0 / 18	10 U	MA-MW-5S-R2	NSV	-- / --	--	-	-
	Tetrachloroethane-1,1,2,2	79-34-5	0 / 18	10 U	MA-MW-5S-R2	610	-- / --	0.02	✓	
	Tetrachloroethylene	127-18-4	4 / 18	1.5	MA-MW-9S-R2	98	0 / 18	0.02		✓
	Toluene	108-88-3	9 / 18	5.9	MA-MW-8S-R2	9.8	0 / 18	0.6		✓
	Trichlorobenzene-1,2,3	87-61-6	2 / 18	0.71	MA-MW-14S-R2	50	0 / 18	0.01		✓
	Trichlorobenzene-1,2,4	120-82-1	2 / 18	2.2	MA-MW-12S-R2	110	0 / 18	0.02		✓
	Trichloroethane	71-55-6	4 / 18	60	MA-MW-20S-R2	11	2 / 18	5.5		✓
	Trichloroethane-1,1,2	79-00-5	1 / 18	0.25 J	MA-MW-9S-R2	1200	0 / 18	0.00		✓
	Trichloroethylene	79-01-6	8 / 18	11	MA-MW-14S-R2	470	0 / 18	0.02		✓
	Trichlorofluoromethane	75-69-4	0 / 18	10 U	MA-MW-5S-R2	11000	-- / --	< 0.01	✓	
	Vinyl chloride	75-01-4	7 / 18	17 J	MA-MW-14S-R2	782	0 / 18	0.02		✓
	Xylenes, total	1330-20-7	5 / 18	17	MA-MW-5S-R2	13	1 / 18	3.0		✓
Total Inorganics (ug/L)	Aluminum	7429-90-5	11 / 18	33300	MA-MW-20S-R2	87	11 / 18	382.8		✓
	Antimony	7440-36-0	0 / 18	18.7 BJ	MA-MW-1S-R2	30	-- / --	0.6	✓	
	Arsenic	7440-38-2	12 / 18	7130 J	MA-MW-1S-R2	150	6 / 18	47.5		✓
	Banum	7440-39-3	12 / 18	36500	MA-MW-13S-R2	4	12 / 18	9125.0		✓

TABLE 18
Step 2 Summary Statistics for Ground Water - Shallow Monitoring Wells from Round 2 (September 2002)
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical Name	CAS No	Frequency of Detection	Maximum		Screening Value	Frequency of Exceedence	HQ ^a	HQ based on	
				Value	SampleID				RL ^b	Detection
	Beryllium	7440-41-7	0 / 18	2.6 B	MA-MW-20S-R2	0.66	-- / --	3.9	✓	
	Cadmium	7440-43-9	3 / 18	45.7	MA-MW-10S-R2	2.2	3 / 18	20.8	✓	
	Calcium	7440-70-2	18 / 18	953000	MA-MW-13S-R2	NSV	0 / 18	--	-	-
	Chromium	7440-47-3	8 / 18	84	MA-MW-20S-R2	11	8 / 18	7.6	✓	
	Cobalt	7440-48-4	0 / 18	20.4 B	MA-MW-20S-R2	23	-- / --	0.9	✓	
	Copper	7440-50-8	3 / 18	41.3	MA-MW-20S-R2	9	3 / 18	24.6	✓	
	Cyanide	57-12-5	6 / 17	38.2	MA-MW-19S-R2	5.2	6 / 17	7.3	✓	
	Iron	7439-89-6	18 / 18	51900	MA-MW-20S-R2	1000	16 / 18	51.9	✓	
	Lead	7439-92-1	13 / 18	192	MA-MW-15S-R2	2.5	13 / 18	76.8	✓	
	Magnesium	7439-95-4	18 / 18	266000	MA-MW-5S-R2	NSV	0 / 18	--	-	-
	Manganese	7439-96-5	17 / 18	1350	MA-MW-18S-R2	120	14 / 18	11.3	✓	
	Mercury	7439-97-6	1 / 18	0.8	MA-MW-13S-R2	0.77	1 / 18	10	✓	
	Nickel	7440-02-0	1 / 18	59	MA-MW-20S-R2	52	1 / 18	1.5	✓	
	Potassium	7440-09-7	17 / 18	119000 J	MA-MW-13S-R2	NSV	0 / 18	--	-	-
	Selenium	7782-49-2	4 / 18	18.8 J	MA-MW-20S-R2	5	4 / 18	3.8	✓	
	Silver	7440-22-4	0 / 18	0.7 U	MA-MW-1S-R2	0.36	-- / --	1.9	✓	
	Sodium	7440-23-5	18 / 18	167000	MA-MW-5S-R2	NSV	0 / 18	--	-	-
	Thallium	7440-28-0	0 / 18	2.6 U	MA-MW-1S-R2	40	-- / --	0.1	✓	
	Vanadium	7440-62-2	1 / 18	67.2	MA-MW-20S-R2	20	1 / 18	3.4	✓	
	Zinc	7440-66-6	12 / 18	2100	MA-MW-17S-R2	120	9 / 18	17.5	✓	

Notes:

^aHQ = Hazard Quotient

^bRL = reporting limit

NSV = no screening value

Shaded cells indicated chemicals with Hazard Quotients greater than 1

TABLE 19
Hazard Quotients (HQs) for Food Web Exposure - Martin Aaron, Inc.
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical	White-footed mouse	American robin
SVOCs	1,2-Dichlorobenzene	<0.01	<0.01
	1,3-Dichlorobenzene	<0.01	<0.01
	2,4,5-Trichlorophenol	0.07	NA
	2,4,6-Trichlorophenol	<0.01	NA
	2,4-Dichlorophenol	<0.01	NA
	2,4-Dinitrophenol	NA	NA
	2,4-Dinitrotoluene	NA	NA
	2-Chloronaphthalene	NA	NA
	2-Chlorophenol	NA	NA
	2-Methylnaphthalene	<0.01	NA
	2-Nitroaniline	NA	NA
	2-Nitrophenol	NA	NA
	3,3'-Dichlorobenzidine	NA	NA
	3-Nitroaniline	NA	NA
	4-Bromophenyl-Phenylether	NA	NA
	4-Chloroaniline	NA	NA
	4-Chlorophenyl-Phenylether	NA	NA
	4-Nitroaniline	NA	NA
	4-Nitrophenol	NA	NA
	Acenaphthylene	<0.01	<0.01
	Anthracene	<0.01	0.07
	Benzo(a)anthracene	0.98	0.06
	Benzo(a)pyrene	1.06	0.07
	Benzo(b)fluoranthene	0.71	0.05
	Benzo(g,h,i)perylene	<0.01	0.02
	Benzo(k)fluoranthene	0.46	0.03
	Bis(2-Chloroethoxy)methane	NA	NA
	Bis(2-Chloroethyl)ether	NA	NA
	Bis(2-Ethylhexyl)phthalate	0.08	3.01
	Butylbenzylphthalate	<0.01	NA
	Carbazole	<0.01	NA
	Chrysene	1.48	0.09
	Dibenz(a,h)anthracene	0.25	0.01
	Dibenzofuran	<0.01	NA
	Di-n-octylphthalate	<0.01	<0.01
	Fluoranthene	0.03	0.20
	Fluorene	<0.01	0.01
	Hexachlorobutadiene	0.15	0.26
	Hexachlorobenzene	0.29	12.62
	Hexachlorocyclopentadiene	0.03	NA
	Hexachloroethane	NA	NA
	Indeno(1,2,3-cd)pyrene	0.66	0.04
	Isophorone	NA	NA
	Naphthalene	<0.01	0.06
	Nitrobenzene	NA	NA
	N-Nitroso-di-n-propylamine	NA	NA
	Phenanthrene	0.02	0.14

TABLE 19
Hazard Quotients (HQs) for Food Web Exposure - Martin Aaron, Inc.
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical	White-footed mouse	American robin
	Pyrene	0.02	0.16
Pesticides/PCBs	4,4'-DDE	0.87	162.28
	4,4'-DDT	0.06	2.15
	Aldrin	0.17	0.15
	alpha-Chlordane	0.13	0.60
	Aroclor-1016	0.23	1.60
	Aroclor-1221	9.07	3.17
	Aroclor-1232	4.58	1.60
	Aroclor-1242	4.58	1.60
	Aroclor-1248	0.25	3.78
	Aroclor-1254	108.78	85.41
	Aroclor-1260	41.22	32.36
	Dieldrin	12.80	6.94
	Endosulfan I	<0.01	<0.01
	Endosulfan II	<0.01	<0.01
	Endosulfan Sulfate	<0.01	<0.01
	Endrin	0.06	1.12
	Endrin Ketone	0.04	0.81
	Gamma-Chlordane	0.14	0.66
	Heptachlor	0.64	0.33
	Methoxychlor	0.01	<0.01
	Toxaphene	0.01	0.79
VOCs	1,1,1-Trichloroethane	NA	NA
	1,1,2,2-Tetrachloroethane	NA	NA
	1,1,2-Trichloroethane	NA	NA
	1,1-Dichloroethane	NA	NA
	1,1-Dichloroethene	NA	NA
	1,2-Dibromo-3-Chloropropane	NA	NA
	1,2-Dibromoethane	NA	NA
	1,2-Dichloroethane	NA	NA
	1,2-Dichloropropane	NA	NA
	2-Butanone	NA	NA
	2-Hexanone	NA	NA
	Acetone	NA	NA
	Benzene	NA	NA
	Bromoform	NA	NA
	Bromomethane	NA	NA
	Carbon Disulfide	NA	NA
	Carbon Tetrachloride	0.05	NA
	Chloroethane	NA	NA
	Chloroform	<0.01	NA
	Chloromethane	NA	NA
	Cis-1,2-Dichloroethene	NA	NA
	Cis-1,3-Dichloropropene	NA	NA
	Dibromochloromethane	NA	NA
	Tetrachloroethene	0.10	NA
	Trans-1,2-Dichloroethene	NA	NA
	Trans-1,3-Dichloropropene	NA	NA

303180

TABLE 19
Hazard Quotients (HQs) for Food Web Exposure - Martin Aaron, Inc.
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical	White-footed mouse	American robin
	Trichloroethene	<0.01	NA
	Vinyl Chloride	NA	NA
	Xylenes (total)	0.91	0.11
Inorganics	Antimony	1.87	<0.01
	Arsenic	261.36	30.47
	Barium	102.48	5.96
	Cadmium	118.76	170.98
	Chromium	6.44	178.87
	Cobalt	0.22	1.64
	Copper	6.57	3.58
	Iron	7.38	11.17
	Lead	20.92	323.23
	Manganese	0.09	0.02
	Mercury	61.67	9.27
	Nickel	2.21	2.45
	Selenium	2.44	2.47
	Silver	0.09	0.02
	Thallium	0.48	0.23
	Vanadium	0.66	0.04
	Zinc	15.09	350.31

NA = not applicable; no ingestion screening value is available

Shaded cells indicated chemicals with Hazard Quotients greater than 1

TABLE 20
Hazard Quotients (HQs) for Food Web Exposure - South Jersey Port Corporation
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical	White-footed mouse	American robin
SVOCs	1,3-Dichlorobenzene	<0.01	<0.01
	2,4,5-Trichlorophenol	0.79	NA
	2,4,6-Trichlorophenol	0.05	NA
	2,4-Dichlorophenol	0.01	NA
	2,4-Dimethylphenol	NA	NA
	2,4-Dinitrophenol	NA	NA
	2,4-Dinitrotoluene	NA	NA
	2-Chloronaphthalene	NA	NA
	2-Chlorophenol	NA	NA
	2-Methylnaphthalene	<0.01	NA
	2-Nitroaniline	NA	NA
	2-Nitrophenol	NA	NA
	3,3'-Dichlorobenzidine	NA	NA
	3-Nitroaniline	NA	NA
	4-Bromophenyl-Phenylether	NA	NA
	4-Chloroaniline	NA	NA
	4-Chlorophenyl-Phenylether	NA	NA
	4-Nitroaniline	NA	NA
	4-Nitrophenol	NA	NA
	Acenaphthene	<0.01	0.03
	Acenaphthylene	<0.01	<0.01
	Anthracene	<0.01	0.08
	Benzo(a)anthracene	0.06	0.07
	Benzo(a)pyrene	0.93	0.06
	Benzo(b)fluoranthene	0.62	0.04
	Benzo(g,h,i)perylene	<0.01	0.01
	Benzo(k)fluoranthene	0.71	0.05
	Bis(2-Chloroethoxy)methane	NA	NA
	Bis(2-Chloroethyl)ether	NA	NA
	Bis(2-Ethylhexyl)phthalate	<0.01	0.01
	Butylbenzylphthalate	0.01	NA
	Carbazole	0.01	NA
	Chrysene	0.60	0.10
	Dibenz(a,h)anthracene	0.01	<0.01
	Dibenzofuran	<0.01	NA
	Diethylphthalate	<0.01	NA
	Di-n-octylphthalate	0.06	0.13
	Fluoranthene	0.03	0.22
	Fluorene	<0.01	0.03
	Hexachlorobutadiene	1.63	2.87
	Hexachlorobenzene	3.20	137.68
	Hexachlorocyclopentadiene	0.31	NA
	Hexachloroethane	NA	NA
	Indeno(1,2,3-cd)pyrene	0.45	0.03
	Isophorone	NA	NA
	Naphthalene	<0.01	<0.01
	Nitrobenzene	NA	NA

TABLE 20
Hazard Quotients (HQs) for Food Web Exposure - South Jersey Port Corporation
Martin Aaron Site, Camden, NJ

Chemical Group	Chemical	White-footed mouse	American robin
	N-Nitroso-di-n-propylamine	NA	NA
	N-Nitrosodiphenylamine	0.03	NA
	Pentachlorophenol	19.74	1.24
	Phenanthrene	0.03	0.22
	Phenol	NA	NA
	Pyrene	0.02	0.15
Pesticides/PCBs	Aroclor-1260	0.22	0.18
	Endosulfan I	<0.01	<0.01
	Endosulfan II	<0.01	<0.01
	Endosulfan Sulfate	<0.01	<0.01
	Gamma-Chlordane	<0.01	<0.01
	Heptachlor	0.01	<0.01
	Toxaphene	<0.01	0.04
VOCs	1,1-Dichloroethene	NA	NA
	1,2-Dibromo-3-Chloropropane	NA	NA
	2-Butanone	NA	NA
	2-Hexanone	NA	NA
	Acetone	NA	NA
	Benzene	NA	NA
	Bromoform	NA	NA
	Bromomethane	NA	NA
	Carbon Disulfide	NA	NA
	Chloroethane	NA	NA
	Chloromethane	NA	NA
	Dibromochloromethane	NA	NA
Inorganics	Arsenic	15.83	1.85
	Barium	13.71	0.80
	Cadmium	5.51	7.93
	Chromium	1.13	31.30
	Copper	1.68	0.92
	Iron	1.98	2.99
	Lead	7.01	108.40
	Manganese	0.06	0.01
	Mercury	29.84	4.49
	Selenium	1.42	1.44
	Silver	<0.01	<0.01
	Thallium	0.45	0.21
	Vanadium	0.53	0.03
	Zinc	1.25	29.02

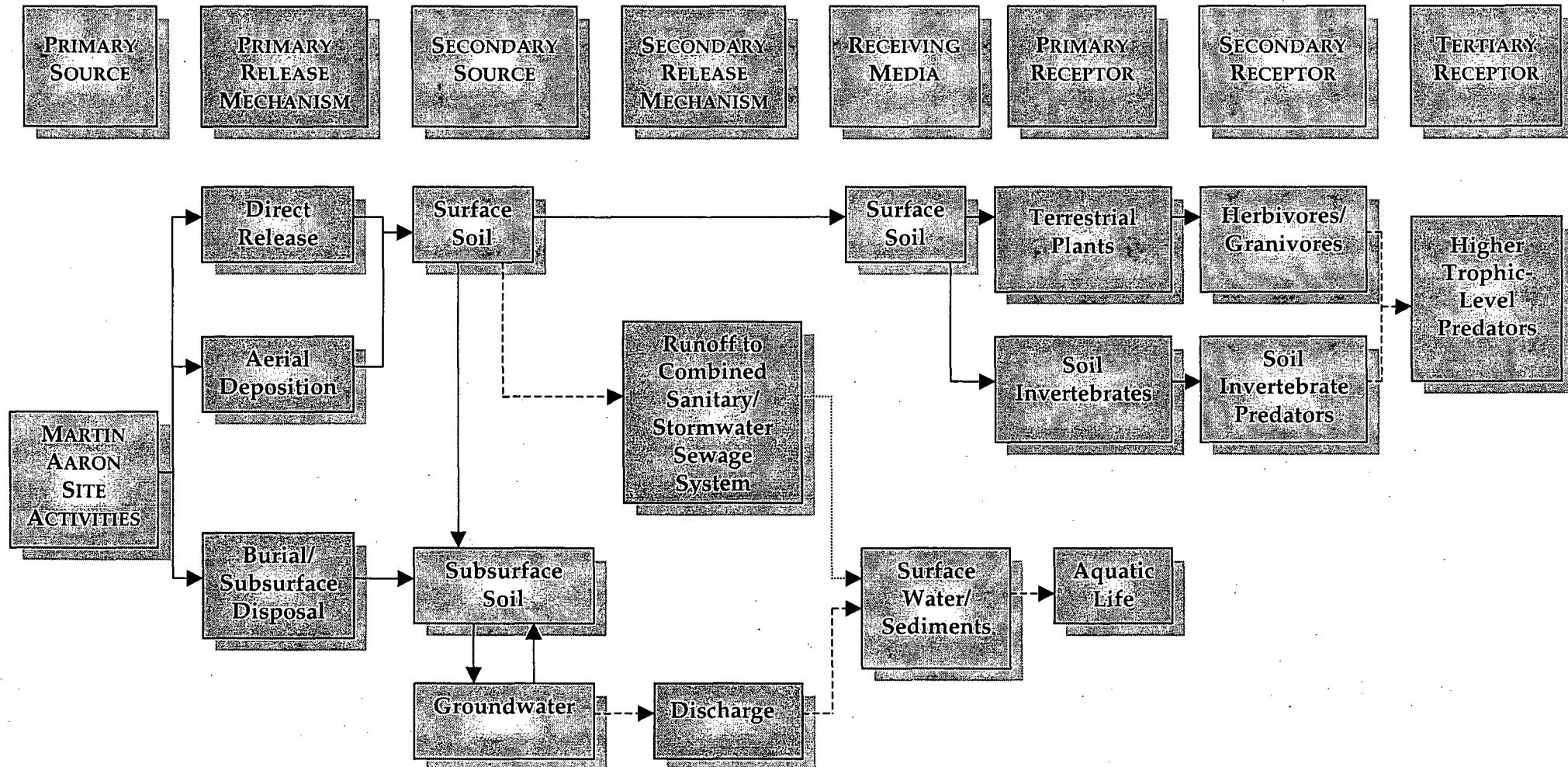
NA = not applicable; no ingestion screening value is available

Shaded cells indicated chemicals with Hazard Quotients greater than 1

Figures

FIGURE

Preliminary Conceptual Model Martin Aaron Site, Camden, NJ



Key:

- Pathway potentially complete but not identified for evaluation
- Pathway potentially complete; identified for evaluation
- Pathway likely complete; identified for quantitative evaluation

Attachment A

Checklist for Ecological Assessment/Sampling

Checklist for Ecological Assessment/Sampling

Martin Aaron, Inc.

I. SITE DESCRIPTION

1. Site Name: Martin Aaron, Inc.
Location: 1542 South Broadway Street

County: Camden City: Camden State: NJ

2. Latitude: 39d 55m 33s north Longitude: 75d 07m 08s west

3. What is the approximate area of the site? 2.4 acres

4. Is this the first site visit? yes no If no, attach trip report of previous site visit(s), if available.
Date(s) of previous site visit(s): _____

5. Please attach to the checklist USGS topographic map(s) of the site, if available.
Site map used from site investigation.

6. Are aerial or other site photographs available? yes no If yes, please attach any available photo(s) to the site map at the conclusion of this section.
Digital photos available.

7. The land use on the site is:

 % Urban

 % Rural

 % Residential

100 % Industrial (light heavy)

 % Agricultural

(Crops: _____)

 % Recreational

(Describe; note if it is a park, etc.)

Approximately 10% covered by structures
and an additional 8 to 10% covered by
pavement/buildings

The area surrounding the site is:
 mile radius

 % Urban

 % Rural

10-20 % Residential

80-90 % Industrial (light heavy)

 % Agricultural

(Crops: _____)

 % Recreational

(Describe; note if it is a park, etc.)

 % Undisturbed

 % Undisturbed

 % Other

 % Other

8. Has any movement of soil taken place at the site? yes no. If yes, please identify the most likely cause of this disturbance:

 Agricultural Use

Heavy Equipment

 Mining

 Natural Events

 Erosion

Other

Please describe:

Buried wastes (e.g. drums) excavated during interim actions. Soil compacted by parking activities.

9. Do any potentially sensitive environmental areas exist adjacent to or in proximity to the site, e.g., Federal and State parks, National and State monuments, wetlands, prairie potholes? *Remember, flood plains and wetlands are not always obvious; do not answer "no" without confirming information.*

Threatened/endangered species and critical habitat search conducted; results included within appendix.

Please provide the source(s) of information used to identify these sensitive areas, and indicate their general location on the site map.

Search to be conducted through USFWS and NJ Natural Heritage Program.

10. What type of facility is located at the site?

Chemical Manufacturing Mixing Waste disposal
 Other (specify) Drum reconditioning with prior industrial uses.

11. What are the suspected contaminants of concern at the site? If known, what are the maximum concentration levels?

VOCs, SVOCs, pesticides, PCBs, inorganics. Wide range of chemicals could have been held by/leaked from drums and containers.

12. Check any potential routes of off-site migration of contaminants observed at the site:

Swales Depressions Drainage ditches
 Runoff Windblown particulates Vehicular traffic
 Other (specify) Noted storm drains in adjacent streets.

13. If known, what is the approximate depth to the water table? Not currently known

14. Is the direction of surface runoff apparent from site observations? yes no If yes, to which of the following does the surface runoff discharge? Indicate all that apply.

Surface water Groundwater Sewer Collection impoundment
(infiltration likely) (combined sewer)

15. Is there a navigable waterbody or tributary to a navigable waterbody? yes no

Not on or immediately adjacent to site.

16. Is there a waterbody anywhere on or in the vicinity of the site? If yes, also complete Section III: Aquatic Habitat Checklist -- Non-Flowing Systems and/or Section IV: Aquatic Habitat Checklist -- Flowing Systems.

yes (approx. distance _____) no

Small onsite wetland; not a viable aqua habitat. Delaware River about 2,000 feet to north; other surrounding water bodies mostly farther away.

17. Is there evidence of flooding? yes no *Wetlands and flood plains are not always obvious; do not answer "no" without confirming information.* If yes, complete Section V: Wetland Habitat Checklist.

18. If a field guide was used to aid any of the identifications, please provide a reference. Also, estimate the time spent identifying fauna. [Use a blank sheet if additional space is needed for text.]

Highly urbanized area; minimal wildlife observed, though visit conducted to provide overview (not quantitative). Approximately three hours spent on site.

19. Are any threatened and/or endangered species (plant or animal) known to inhabit the area of the site? yes
 no *If yes, you are required to verify this information with the U.S. Fish and Wildlife Service.* If species' identities are known, please list them next.

Updated threatened/endangered species search conducted as part of SERA.

20. Record weather conditions at the time this checklist was prepared:

DATE: 07/23/2001

70 Temperature (°C/°F) -- Normal daily high temperature

~ 5 mph max Wind (direction/speed) None Precipitation (rain, snow) None

Partly Cloudy Cloud cover

IA. SUMMARY OF OBSERVATIONS AND SITE SETTING

Site habitats impacted by past activities. Approximately 10% covered by structures and an additional 8 to 10% covered by pavement/buildings. Remaining areas mostly bare soil with patchy mixed grass cover. Appears to be mostly ragweed. High gravel/rubble content in soil. Couple of mixed deciduous hardwood along eastern/northern site boundary.

No aquatic habitats onsite. Small wetland (~ 4' x 8') overgrown by cattail in small depressed area. Appears it would contain water only immediately following storm event. No clear evidence of water drainage patterns (erosional channels, etc.).

Area surrounding site is high density industrial/residential development. Surface mostly paved. Noted storm drains on both South Broadway and Sixth Streets immediately adjacent to site areas.

Delaware River and several smaller rivers nearby. Check topos and NWI maps.

Completed by Mike Elias Affiliation CH2M HILL

Additional Preparers _____

SiteManager _____

Date 02/23/2001

II. TERRESTRIAL HABITAT CHECKLIST

IIA. WOODED

1. Are there any wooded areas at the site? yes no If no, go to Section IIB: Shrub/Scrub.
2. What percentage or area of the site is wooded? (____ % ____ acres). Indicate the wooded area on the site map which is attached to a copy of this checklist. Please identify what information was used to determine the wooded area of the site.
3. What is the dominant type of vegetation in the wooded area? (Circle one: Evergreen/Deciduous/ Mixed) Provide a photograph, if available.

Dominant plant, if known: _____

4. What is the predominant size of the trees at the site? Use diameter at breast height.

0-6 in. 6-12 in. > 12 in.

5. Specify type of understory present, if known. Provide a photograph, if available.

IIB. SHRUB/SCRUB

1. Is shrub/scrub vegetation present at the site? yes no If no, go to Section IIC: Open Field.
2. What percentage of the site is covered by scrub/shrub vegetation? (____ % ____ acres). Indicate the areas of shrub/scrub on the site map. Please identify what information was used to determine this area.
3. What is the dominant type of scrub/shrub vegetation, if known? Provide a photograph, if available.
4. What is the approximate average height of the scrub/shrub vegetation?
 0-2 ft. 2-5 ft. > 5 ft.
5. Based on site observations, how dense is the scrub/shrub vegetation?
 Dense Patchy Sparse

IIC. OPEN FIELD

1. Are there open (bare, barren) field areas present at the site? yes no If yes, please indicate the type below:

Prairie/plains Savannah Old field Other (specify) Bare soil; opportunistic grass

2. What percentage of the site is open field? (65 % of 2.4 acres). Indicate the open fields on the site map.
3. What is/are the dominant plant(s)? Provide a photograph, if available.

Opportunistic grasses. Appears to be mostly ragweed. Grass grown appears to be limited by parking activity (reportedly occurs onsite).

4. What is the approximate average height of the dominant plant? ~ 2 feet
5. Describe the vegetation cover: Dense Sparse Patchy

IID. MISCELLANEOUS

1. Are other types of terrestrial habitats present at the site, other than woods, scrub/shrub, and open field?
 yes no If yes, identify and describe them below.
2. Describe the terrestrial miscellaneous habitat(s) and identify these area(s) on the site map.

3. What observations, if any, were made at the site regarding the presence and/or absence of insects, fish, birds, mammals, etc.?

Few birds observed: robins, starlings, crow. No mammals observed. Very little sign of other wildlife. Extremely disturbed habitat surrounded by high density industrial/residential development.

4. Review the questions in Section I to determine if any additional habitat checklists should be completed for this site.

III. AQUATIC HABITAT CHECKLIST -- NON-FLOWING SYSTEMS

Note: Aquatic systems are often associated with wetland habitats. Please refer to Section V, Wetland Habitat Checklist.

1. What type of open-water, non-flowing system is present at the site?

- Natural (pond, lake)
 Artificially created (lagoon, reservoir, canal, impoundment)

No open water habitats present on site. Most of section is accordingly not completed.

2. If known, what is the name(s) of the waterbody(ies) on or adjacent to the site?

Delaware River and smaller branching systems ranging from ~2,000 – 6,000 feet from site. May be smaller wetland areas nearby; check NWI map.

3. If a waterbody is present, what are its known uses (e.g.: recreation, navigation, etc.)?

4. What is the approximate size of the waterbody(ies)? _____ acre(s).

5. Is any aquatic vegetation present? yes no If yes, please identify the type of vegetation present if known.

- Emergent Submergent Floating

6. If known, what is the depth of the water? _____

7. What is the general composition of the substrate? Check all that apply.

- | | | |
|--|--|--|
| <input type="checkbox"/> Bedrock | <input type="checkbox"/> Sand (coarse) | <input type="checkbox"/> Muck (fine/black) |
| <input type="checkbox"/> Boulder (>10 in.) | <input type="checkbox"/> Silt (fine) | <input type="checkbox"/> Debris |
| <input type="checkbox"/> Cobble (2.5-10 in.) | <input type="checkbox"/> Marl (shells) | <input type="checkbox"/> Detritus |
| <input type="checkbox"/> Gravel (0.1-2.5 in.) | <input type="checkbox"/> Clay (slick) | <input type="checkbox"/> Concrete |
| <input type="checkbox"/> Other (specify) _____ | | |

8. What is the source of water in the waterbody?

- | | | |
|---|---|--|
| <input type="checkbox"/> River/Stream/Creek | <input type="checkbox"/> Groundwater | <input type="checkbox"/> Other (specify) _____ |
| <input type="checkbox"/> Industrial discharge | <input type="checkbox"/> Surface runoff | |

9. Is there a discharge from the site to the waterbody? yes no If yes, please describe this discharge and its path.

10. Is there a discharge from the waterbody? yes no If yes, and the information is available, identify from the list below the environment into which the waterbody discharges.

- | | | | |
|---|---------------------------------|----------------------------------|----------------|
| <input type="checkbox"/> River/Stream/Creek | <input type="checkbox"/> onsite | <input type="checkbox"/> offsite | Distance _____ |
| <input type="checkbox"/> Groundwater | <input type="checkbox"/> onsite | <input type="checkbox"/> offsite | |
| <input type="checkbox"/> Wetland | <input type="checkbox"/> onsite | <input type="checkbox"/> offsite | Distance _____ |
| <input type="checkbox"/> Impoundment | <input type="checkbox"/> onsite | <input type="checkbox"/> offsite | |

11. Identify any field measurements and observations of water quality that were made. For those parameters for which data were collected provide the measurement and the units of measure below:

_____ Area

_____ Depth (average)

_____ Temperature (depth of the water at which the reading was taken) _____

_____ pH

_____ Dissolved oxygen

_____ Salinity

_____ Turbidity (clear, slightly turbid, turbid, opaque) (Secchi disk depth _____)

_____ Other (specify)

12. Describe observed color and area of coloration.

13. Mark the open-water, non-flowing system on the site map attached to this checklist.

14. What observations, if any, were made at the waterbody regarding the presence and/or absence of benthic macroinvertebrates, fish, birds, mammals, etc.?

IV. AQUATIC HABITAT CHECKLIST -- FLOWING SYSTEMS None

Note: Aquatic systems are often associated with wetland habitats. Please refer to Section V, Wetland Habitat Checklist.

1. What type(s) of flowing water system(s) is (are) present at the site?

<input type="checkbox"/> River	<input type="checkbox"/> Stream	<input type="checkbox"/> Creek
<input type="checkbox"/> Dry wash	<input type="checkbox"/> Arroyo	<input type="checkbox"/> Brook
<input type="checkbox"/> Artificially created (ditch, etc.)	<input type="checkbox"/> Intermittent Stream	<input type="checkbox"/> Channeling
<input type="checkbox"/> Other (specify) _____		

2. If known, what is the name of the waterbody? _____

3. For natural systems, are there any indicators of physical alteration (e.g., channeling, debris, etc.)?

yes no If yes, please describe indicators that were observed.

4. What is the general composition of the substrate? Check all that apply.

<input type="checkbox"/> Bedrock	<input type="checkbox"/> Sand (coarse)	<input type="checkbox"/> Muck (fine/black)
<input type="checkbox"/> Boulder (>10 in.)	<input type="checkbox"/> Silt (fine)	<input type="checkbox"/> Debris
<input type="checkbox"/> Cobble (2.5-10 in.)	<input type="checkbox"/> Marl (shells)	<input type="checkbox"/> Detritus
<input type="checkbox"/> Gravel (0.1-2.5 in.)	<input type="checkbox"/> Clay (slick)	<input type="checkbox"/> Concrete
<input type="checkbox"/> Other (specify) _____		

5. What is the condition of the bank (e.g., height, slope, extent of vegetative cover)?

6. Is the system influenced by tides? yes no What information was used to make this determination?

7. Is the flow intermittent? yes no If yes, please note the information that was used in making this determination.
8. Is there a discharge from the site to the waterbody? yes no If yes, please describe the discharge and its path.
9. Is there a discharge from the waterbody? yes no If yes, and the information is available, please identify what the waterbody discharges to and whether the discharge is on site or off site.
10. Identify any field measurements and observations of water quality that were made. For those parameters for which data were collected, provide the measurement and the units of measure in the appropriate space below:
- _____ Width (ft.)
- _____ Depth (ft.)
- _____ Velocity (specify units): _____
- _____ Temperature (depth of the water at which the reading was taken _____)
- _____ pH
- _____ Dissolved oxygen
- _____ Salinity
- _____ Turbidity (clear, slightly turbid, turbid, opaque) (Secchi disk depth _____)
- _____ Other (specify) _____

11. Describe observed color and area of coloration.

12. Is any aquatic vegetation present? yes no If yes, please identify the type of vegetation present, if known.

Emergent Submergent Floating

13. Mark the flowing water system on the attached site map.

14. What observations were made at the waterbody regarding the presence and/or absence of benthic macroinvertebrates, fish, birds, mammals, etc.?

V. WETLAND HABITAT CHECKLIST

1. Based on observations and/or available information, are designated or known wetlands definitely present at the site?

yes no Wetland area observed; likely resulting from removal activity.

Please note the sources of observations and information used (e.g., USGS Topographic Maps, National Wetland Inventory, Federal or State Agency, etc.) to make this determination.

Observation. Wetland inventory map is being obtained to verify wetland occurrence.

2. Based on the location of the site (e.g., along a waterbody, in a floodplain) and site conditions (e.g., standing water; dark, wet soils; mud cracks; debris line; water marks), are wetland habitats suspected?

yes no If yes, proceed with the remainder of the wetland habitat identification checklist.

Unlikely to have any other wetlands onsite besides small one noted above; which is likely to result from removal action.

3. What type(s) of vegetation are present in the wetland?

Submergent Emergent

Scrub/Shrub Wooded

(Cattails)

Other (specify) _____

4. Provide a general description of the vegetation present in and around the wetland (height, color, etc.). Provide a photograph of the known or suspected wetlands, if available.

Cattails.

5. Is standing water present? yes no If yes, is this water: Fresh Brackish

What is the approximate area of the water (sq. ft.)? _____

Please complete questions 4, 11, 12 in Checklist III - Aquatic Habitat -- Non-Flowing Systems.

6. Is there evidence of flooding at the site? What observations were noted? No evidence of flooding.

Buttressing Water marks Mud cracks

Debris line Other (describe below)

7. If known, what is the source of the water in the wetland?

- Stream/River/Creek/Lake/Pond Groundwater
 Flooding Surface Runoff

8. Is there a discharge from the site to a known or suspected wetland? yes no If yes, please describe.

No observed area of discharge. Appears water would simply puddle.

9. Is there a discharge from the wetland? yes no. If yes, to what waterbody is discharge released?

- Surface Stream/River Groundwater Lake/Pond Marine

10. If a soil sample was collected, describe the appearance of the soil in the wetland area. Circle or write in the best response.

Color (blue/gray, brown, black, mottled) _____

Water content (dry, wet, saturated/unsaturated) _____

11. Mark the observed wetland area(s) on the attached site map.

Checklist for Ecological Assessment/Sampling

South Jersey Port Corporation

I. SITE DESCRIPTION

1. Site Name: South Jersey Port Corporation

Location: 1535 South Broadway Street

County: Camden City: Camden State: NJ

2. Latitude: 39d 55m 33s north Longitude: 75d 07m 08s west

3. What is the approximate area of the site? 3.6 acres

4. Is this the first site visit? yes no If no, attach trip report of previous site visit(s), if available.

Date(s) of previous site visit(s): _____

5. Please attach to the checklist USGS topographic map(s) of the site, if available.

Site map used from site investigation.

6. Are aerial or other site photographs available? yes no If yes, please attach any available photo(s) to the site map at the conclusion of this section.

Digital photos available.

7. The land use on the site is:

 % Urban

 % Rural

 % Residential

100 % Industrial (light heavy)

 % Agricultural

(Crops: _____)

 % Recreational

(Describe; note if it is a park, etc.)

Approximately 25% covered by buildings;
20% by concrete/pavement; remainder
mowed mixed grasses

 % Undisturbed

 % Other

The area surrounding the site is:

 mile radius

 % Urban

 % Rural

10-20 % Residential

80-90 % Industrial (light heavy)

 % Agricultural

(Crops: _____)

 % Recreational

(Describe; note if it is a park, etc.)

8. Has any movement of soil taken place at the site? yes no. If yes, please identify the most likely cause of this disturbance:

 Agricultural Use

Heavy Equipment

 Mining

 Natural Events

 Erosion

 Other

Please describe:

9. Do any potentially sensitive environmental areas exist adjacent to or in proximity to the site, e.g., Federal and State parks, National and State monuments, wetlands, prairie potholes? *Remember, flood plains and wetlands are not always obvious; do not answer "no" without confirming information.*

Threatened/endangered species and critical habitat search conducted; results included within appendix.

Please provide the source(s) of information used to identify these sensitive areas, and indicate their general location on the site map.

Search to be conducted through USFWS and NJ Natural Heritage Program.

10. What type of facility is located at the site?

Chemical Manufacturing Mixing Waste disposal
 Other (specify) Parking

11. What are the suspected contaminants of concern at the site? If known, what are the maximum concentration levels?

VOCs, SVOCs, pesticides, PCBs, inorganics. Wide range of chemicals could have been held by/leaked from drums and containers.

12. Check any potential routes of off-site migration of contaminants observed at the site:

Swales Depressions Drainage ditches
 Runoff Windblown particulates Vehicular traffic

Other (specify) Noted storm drains in adjacent streets.

13. If known, what is the approximate depth to the water table? Not currently known

14. Is the direction of surface runoff apparent from site observations? yes no If yes, to which of the following does the surface runoff discharge? Indicate all that apply.

Surface water Groundwater Sewer Collection impoundment
(infiltration likely) (combined sewer)

15. Is there a navigable waterbody or tributary to a navigable waterbody? yes no

Not on or immediately adjacent to site.

16. Is there a waterbody anywhere on or in the vicinity of the site? If yes, also complete Section III: Aquatic Habitat Checklist -- Non-Flowing Systems and/or Section IV: Aquatic Habitat Checklist -- Flowing Systems.

yes (approx. distance _____) no

Delaware River about 2,000 feet to north; other surrounding water bodies mostly farther away.

17. Is there evidence of flooding? yes no *Wetlands and flood plains are not always obvious; do not answer "no" without confirming information.* If yes, complete Section V: Wetland Habitat Checklist.

18. If a field guide was used to aid any of the identifications, please provide a reference. Also, estimate the time spent identifying fauna. [Use a blank sheet if additional space is needed for text.]

Highly urbanized area; minimal wildlife observed, though visit conducted to provide overview (not quantitative). Approximately three hours spent on site.

19. Are any threatened and/or endangered species (plant or animal) known to inhabit the area of the site? yes
 no *If yes, you are required to verify this information with the U.S. Fish and Wildlife Service.* If species' identities are known, please list them next.

Updated threatened/endangered species search conducted as part of SERA.

20. Record weather conditions at the time this checklist was prepared:

DATE: 07/23/2001

70 Temperature (°C/°F) -- Normal daily high temperature

~ 5 mph max Wind (direction/speed) None Precipitation (rain, snow) None

Partly Cloudy Cloud cover

IA. SUMMARY OF OBSERVATIONS AND SITE SETTING

Site habitats impacted by past activities. Approximately 25% covered by structures and an additional 20% covered by pavement/buildings. Remaining areas mostly bare soil with patchy mixed grass cover. Appears to be mostly ragweed. High gravel/rubble content in soil.

No aquatic habitats onsite. No clear evidence of water drainage patterns (erosional channels, etc.).

Area surrounding site is high density industrial/residential development. Surface mostly paved. Noted storm drains on both South Broadway and Sixth Streets immediately adjacent to site areas.

Delaware River and several smaller rivers nearby. Check topos and NWI maps.

Completed by Mike Elias Affiliation CH2M HILL

Additional Preparers _____

SiteManager _____

Date 02/23/2001

II. TERRESTRIAL HABITAT CHECKLIST

IIA. WOODED

1. Are there any wooded areas at the site? yes no If no, go to Section IIB: Shrub/Scrub.
2. What percentage or area of the site is wooded? (____% ____ acres). Indicate the wooded area on the site map which is attached to a copy of this checklist. Please identify what information was used to determine the wooded area of the site.

3. What is the dominant type of vegetation in the wooded area? (Circle one: Evergreen/Deciduous/ Mixed) Provide a photograph, if available.

Dominant plant, if known: _____

4. What is the predominant size of the trees at the site? Use diameter at breast height.

0-6 in. 6-12 in. > 12 in.

5. Specify type of understory present, if known. Provide a photograph, if available.

IIB. SHRUB/SCRUB

1. Is shrub/scrub vegetation present at the site? yes no If no, go to Section IIC: Open Field.

2. What percentage of the site is covered by scrub/shrub vegetation? (____% ____ acres). Indicate the areas of shrub/scrub on the site map. Please identify what information was used to determine this area.

3. What is the dominant type of scrub/shrub vegetation, if known? Provide a photograph, if available.

4. What is the approximate average height of the scrub/shrub vegetation?

0-2 ft. 2-5 ft. > 5 ft.

5. Based on site observations, how dense is the scrub/shrub vegetation?

Dense Patchy Sparse

IIC. OPEN FIELD

1. Are there open (bare, barren) field areas present at the site? yes no If yes, please indicate the type below:

Prairie/plains Savannah Old field Other (specify) Mowed mixed grasses

2. What percentage of the site is open field? (55 % of 3.6 acres). Indicate the open fields on the site map.
3. What is/are the dominant plant(s)? Provide a photograph, if available.

Opportunistic grasses. Appears to be mostly ragweed. Grass grown appears to be limited by parking activity (reportedly occurs onsite).

4. What is the approximate average height of the dominant plant? ~ 2 feet
5. Describe the vegetation cover: Dense Sparse Patchy

IID. MISCELLANEOUS

1. Are other types of terrestrial habitats present at the site, other than woods, scrub/shrub, and open field?
 yes no If yes, identify and describe them below.
2. Describe the terrestrial miscellaneous habitat(s) and identify these area(s) on the site map.

3. What observations, if any, were made at the site regarding the presence and/or absence of insects, fish, birds, mammals, etc.?

Few birds observed: robins, starlings, crow. No mammals observed. Very little sign of other wildlife. Extremely disturbed habitat surrounded by high density industrial/residential development.

4. Review the questions in Section I to determine if any additional habitat checklists should be completed for this site.

III. AQUATIC HABITAT CHECKLIST -- NON-FLOWING SYSTEMS

Note: Aquatic systems are often associated with wetland habitats. Please refer to Section V, Wetland Habitat Checklist.

1. What type of open-water, non-flowing system is present at the site?

- Natural (pond, lake)
 Artificially created (lagoon, reservoir, canal, impoundment)

No open water habitats present on site. Most of section is accordingly not completed.

2. If known, what is the name(s) of the waterbody(ies) on or adjacent to the site?

Delaware River and smaller branching systems ranging from ~2,000 – 6,000 feet from site. May be smaller wetland areas nearby; check NWI map.

3. If a waterbody is present, what are its known uses (e.g.: recreation, navigation, etc.)?

4. What is the approximate size of the waterbody(ies)? _____ acre(s).

5. Is any aquatic vegetation present? yes no If yes, please identify the type of vegetation present if known.

- Emergent Submergent Floating

6. If known, what is the depth of the water? _____

7. What is the general composition of the substrate? Check all that apply.

- | | | |
|--|--|--|
| <input type="checkbox"/> Bedrock | <input type="checkbox"/> Sand (coarse) | <input type="checkbox"/> Muck (fine/black) |
| <input type="checkbox"/> Boulder (>10 in.) | <input type="checkbox"/> Silt (fine) | <input type="checkbox"/> Debris |
| <input type="checkbox"/> Cobble (2.5-10 in.) | <input type="checkbox"/> Marl (shells) | <input type="checkbox"/> Detritus |
| <input type="checkbox"/> Gravel (0.1-2.5 in.) | <input type="checkbox"/> Clay (slick) | <input type="checkbox"/> Concrete |
| <input type="checkbox"/> Other (specify) _____ | | |

8. What is the source of water in the waterbody?

- | | | |
|---|---|--|
| <input type="checkbox"/> River/Stream/Creek | <input type="checkbox"/> Groundwater | <input type="checkbox"/> Other (specify) _____ |
| <input type="checkbox"/> Industrial discharge | <input type="checkbox"/> Surface runoff | |

9. Is there a discharge from the site to the waterbody? yes no If yes, please describe this discharge and its path.

10. Is there a discharge from the waterbody? yes no If yes, and the information is available, identify from the list below the environment into which the waterbody discharges.

<input type="checkbox"/> River/Stream/Creek	<input type="checkbox"/> onsite	<input type="checkbox"/> offsite	Distance _____
<input type="checkbox"/> Groundwater	<input type="checkbox"/> onsite	<input type="checkbox"/> offsite	
<input type="checkbox"/> Wetland	<input type="checkbox"/> onsite	<input type="checkbox"/> offsite	Distance _____
<input type="checkbox"/> Impoundment	<input type="checkbox"/> onsite	<input type="checkbox"/> offsite	

11. Identify any field measurements and observations of water quality that were made. For those parameters for which data were collected provide the measurement and the units of measure below:

_____ Area

_____ Depth (average)

_____ Temperature (depth of the water at which the reading was taken) _____

_____ pH

_____ Dissolved oxygen

_____ Salinity

_____ Turbidity (clear, slightly turbid, turbid, opaque) (Secchi disk depth _____)

_____ Other (specify)

12. Describe observed color and area of coloration.

13. Mark the open-water, non-flowing system on the site map attached to this checklist.

14. What observations, if any, were made at the waterbody regarding the presence and/or absence of benthic macroinvertebrates, fish, birds, mammals, etc.?

303213

IV. AQUATIC HABITAT CHECKLIST -- FLOWING SYSTEMS None

Note: Aquatic systems are often associated with wetland habitats. Please refer to Section V, Wetland Habitat Checklist.

1. What type(s) of flowing water system(s) is (are) present at the site?

<input type="checkbox"/> River	<input type="checkbox"/> Stream	<input type="checkbox"/> Creek
<input type="checkbox"/> Dry wash	<input type="checkbox"/> Arroyo	<input type="checkbox"/> Brook
<input type="checkbox"/> Artificially created (ditch, etc.)	<input type="checkbox"/> Intermittent Stream	<input type="checkbox"/> Channeling
<input type="checkbox"/> Other (specify) _____		

2. If known, what is the name of the waterbody? _____

3. For natural systems, are there any indicators of physical alteration (e.g., channeling, debris, etc.)?

yes no If yes, please describe indicators that were observed.

4. What is the general composition of the substrate? Check all that apply.

<input type="checkbox"/> Bedrock	<input type="checkbox"/> Sand (coarse)	<input type="checkbox"/> Muck (fine/black)
<input type="checkbox"/> Boulder (>10 in.)	<input type="checkbox"/> Silt (fine)	<input type="checkbox"/> Debris
<input type="checkbox"/> Cobble (2.5-10 in.)	<input type="checkbox"/> Marl (shells)	<input type="checkbox"/> Detritus
<input type="checkbox"/> Gravel (0.1-2.5 in.)	<input type="checkbox"/> Clay (slick)	<input type="checkbox"/> Concrete
<input type="checkbox"/> Other (specify) _____		

5. What is the condition of the bank (e.g., height, slope, extent of vegetative cover)?

6. Is the system influenced by tides? yes no What information was used to make this determination?

7. Is the flow intermittent? yes no If yes, please note the information that was used in making this determination.
8. Is there a discharge from the site to the waterbody? yes no If yes, please describe the discharge and its path.
9. Is there a discharge from the waterbody? yes no If yes, and the information is available, please identify what the waterbody discharges to and whether the discharge is on site or off site.
10. Identify any field measurements and observations of water quality that were made. For those parameters for which data were collected, provide the measurement and the units of measure in the appropriate space below:
- _____ Width (ft.)
- _____ Depth (ft.)
- _____ Velocity (specify units): _____
- _____ Temperature (depth of the water at which the reading was taken _____)
- _____ pH
- _____ Dissolved oxygen
- _____ Salinity
- _____ Turbidity (clear, slightly turbid, turbid, opaque) (Secchi disk depth _____)
- _____ Other (specify) _____

11. Describe observed color and area of coloration.

12. Is any aquatic vegetation present? yes no If yes, please identify the type of vegetation present, if known.

Emergent Submergent Floating

13. Mark the flowing water system on the attached site map.

14. What observations were made at the waterbody regarding the presence and/or absence of benthic macroinvertebrates, fish, birds, mammals, etc.?

V. WETLAND HABITAT CHECKLIST

1. Based on observations and/or available information, are designated or known wetlands definitely present at the site?

yes no

Please note the sources of observations and information used (e.g., USGS Topographic Maps, National Wetland Inventory, Federal or State Agency, etc.) to make this determination.

Observation. Wetland inventory map is being obtained to verify wetland occurrence.

2. Based on the location of the site (e.g., along a waterbody, in a floodplain) and site conditions (e.g., standing water; dark, wet soils; mud cracks; debris line; water marks), are wetland habitats suspected?

yes no If yes, proceed with the remainder of the wetland habitat identification checklist.

Unlikely to have any other wetlands onsite besides small one noted above; which is likely to result from removal action.

3. What type(s) of vegetation are present in the wetland?

Submergent Emergent

Scrub/Shrub Wooded

(Cattails)

Other (specify) _____

4. Provide a general description of the vegetation present in and around the wetland (height, color, etc.). Provide a photograph of the known or suspected wetlands, if available.

5. Is standing water present? yes no If yes, is this water: Fresh Brackish

What is the approximate area of the water (sq. ft.)? _____

Please complete questions 4, 11, 12 in Checklist III - Aquatic Habitat -- Non-Flowing Systems.

6. Is there evidence of flooding at the site? What observations were noted? No evidence of flooding.

Buttressing Water marks Mud cracks

Debris line Other (describe below)

7. If known, what is the source of the water in the wetland?

- Stream/River/Creek/Lake/Pond Groundwater
 Flooding Surface Runoff

8. Is there a discharge from the site to a known or suspected wetland? yes no If yes, please describe.

9. Is there a discharge from the wetland? yes no. If yes, to what waterbody is discharge released?

- Surface Stream/River Groundwater Lake/Pond Marine

10. If a soil sample was collected, describe the appearance of the soil in the wetland area. Circle or write in the best response.

Color (blue/gray, brown, black, mottled) _____

Water content (dry, wet, saturated/unsaturated) _____

11. Mark the observed wetland area(s) on the attached site map.

Attachment B

Threatened and Endangered Species Search

Results



State of New Jersey

James E. McGreevey
Governor

Department of Environmental Protection
Division of Parks and Forestry
Office of Natural Lands Management
Natural Heritage Program
P.O. Box 404
Trenton, NJ 08625-0404
Tel. #609-984-1339
Fax. #609-984-1427

Bradley M. Campbell
Commissioner

January 2, 2003

Laura McCarthy
CH2M Hill
13921 Park Center Road, Suite 600
Herndon, VA 20171

Re: Environmental Risk Assessment

Dear Ms. McCarthy:

Thank you for your data request regarding rare species information for the above referenced project site in Camden City, Camden County.

The Natural Heritage Data Base does not have any records for rare plants or natural communities on the site.

The Landscape Project (Version 1.0) does not have any records for suitable habitat or rare animal species on the project site.

Attached is a list of rare species from records in the general vicinity of the project site (within approximately five miles). Also attached is a list of rare species and natural communities that have been documented from Camden County. This county list can be used as a master species list for directing further inventory work. If suitable habitat is present at the project site, these species have potential to be present. If you have questions concerning the wildlife records or wildlife species mentioned in this response, we recommend you contact the Division of Fish and Wildlife, Endangered and Nongame Species Program.

PLEASE SEE THE ATTACHED 'CAUTIONS AND RESTRICTIONS ON NHP DATA'.

Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,

Herbert A. Lord

Herbert A. Lord
Data Request Specialist

cc: Thomas F. Breden
Lawrence Niles
NHP File No. 03-3907581



United States Department of the Interior



FISH AND WILDLIFE SERVICE

New Jersey Field Office

Ecological Services

927 North Main Street, Building D
Pleasantville, New Jersey 08232

Tel: 609/646 9310

Fax: 609/646 0352

<http://njfieldoffice.fws.gov>

In Reply Refer to:

ES-02/872

JAN 6 2003

Laura McCarthy, Environmental Scientist
CH2M Hill
13921 Park Center Road, Suite 600
Herndon, Virginia 20171

Dear Ms. McCarthy:

This responds to your December 11, 2002 request to the U.S. Fish and Wildlife Service (Service) for information on the presence of federally listed endangered and threatened species within the vicinity of an unnamed former industrial site located within Camden City, Camden County, New Jersey. The Service understands that reconditioning and recycling of drums containing chemicals used for wool blending and leather tanning occurred on the site. The current function of the site has not been determined.

AUTHORITY

The following comments provide technical assistance for federally listed threatened and endangered species only and do not constitute consultation for any project pursuant to the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) or comments by the Service as afforded by the December 22, 1993 Memorandum of Agreement among the U.S. Environmental Protection Agency, New Jersey Department of Environmental Protection (NJDEP), and the Service, if project implementation requires a permit from the NJDEP pursuant to the New Jersey Freshwater Wetlands Protection Act (N.J.S.A. 13:9B *et seq.*); nor do they preclude comments on any forthcoming environmental documents pursuant to the National Environmental Policy Act of 1969 as amended (83 Stat. 852; 42 U.S.C. 4321 *et seq.*).

FEDERALLY LISTED SPECIES

Except for an occasional transient bald eagle (*Haliaeetus leucocephalus*), no other federally listed or proposed endangered or threatened flora or fauna under Service jurisdiction are known to occur within the project boundary or within a 5 mile radius of the proposed project site. Therefore, no further consultation pursuant to Section 7 of the ESA is required by the Service. If additional information on federally listed species becomes available, or if project plans change, this determination may be reconsidered.

303221

Current information regarding federally listed and candidate species occurring in New Jersey is enclosed, as well as addresses of State agencies that may be contacted for current site-specific information regarding federal candidate and State-listed species. The Service encourages federal agencies and other planners to consider federal candidate species in project planning.

OTHER SERVICE CONCERNS

Known nest sites of the peregrine falcon (*Falco peregrinus*) are located on bridges and several tall buildings within the vicinity of the project site and may use the project site to forage. Formerly listed as endangered, the peregrine falcon is now found along the rivers and seacoasts of New Jersey. Peregrine falcons typically nest on ledges and in small shallow caves located high on cliff walls, or on man-made platforms. The species also occurs in urban areas, nesting on bridges and tall buildings. Peregrines feed on songbirds, gulls, terns, shorebirds, and wading birds.

In August 1999, the Service removed the peregrine falcon from the List of Endangered and Threatened Wildlife and Plants, removing all protections provided to the species under the ESA. Section 4(g)(1) of the ESA requires monitoring of de-listed species for a minimum of 5 years. The Service has decided to monitor the peregrine falcon for 13 years, to provide data that will reflect the status of at least two generations of birds. If it becomes evident during this period that the peregrine falcon is not maintaining its recovered status, the species could be re-listed under the ESA. The peregrine falcon continues to be protected by the Migratory Bird Treaty Act (40 Stat. 755; 16 U.S.C. 703-713), which prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests except when specifically authorized by the Department of the Interior. The peregrine falcon also continues to be protected under New Jersey law (N.J.S.A. 23:2A *et seq.*) as a State-listed (endangered) species. Please contact the Endangered and Nongame Species Program (ENSP) (address enclosed) to determine whether potential restoration or clean-up activities may affect nesting peregrine falcons.

A known occurrence of the State-listed (endangered) plant, American mannagrass (*Glyceria grandis*) is documented within the vicinity of the project site. If field surveys are conducted at the project site, the Service recommends the survey also include American mannagrass. Please contact the New Jersey Natural Heritage Program for additional information regarding this species (address enclosed).

Additional information about the peregrine falcon is enclosed. Information is also enclosed regarding permit requirements for activities in wetlands. Please contact Lisa Solberg of my staff at (609) 646-9310, extension 47 if you have any questions about the enclosed material or require further assistance regarding federally listed endangered or threatened species.

Sincerely,

Lisa P. Arroyo

for John C. Staples
Assistant Supervisor

Enclosures

EXPLANATIONS OF CODES USED IN NATURAL HERITAGE REPORTS

FEDERAL STATUS CODES

The following U.S. Fish and Wildlife Service categories and their definitions of endangered and threatened plants and animals have been modified from the U.S. Fish and Wildlife Service (F.R. Vol. 50 No. 188; Vol. 61, No. 40; F.R. 50 CFR Part 17). Federal Status codes reported for species follow the most recent listing.

- LE Taxa formally listed as endangered.
- LT Taxa formally listed as threatened.
- PE Taxa already proposed to be formally listed as endangered.
- PT Taxa already proposed to be formally listed as threatened.
- C Taxa for which the Service currently has on file sufficient information on biological vulnerability and threat(s) to support proposals to list them as endangered or threatened species.
- S/A Similarity of appearance species.

STATE STATUS CODES

Two animal lists provide state status codes after the Endangered and Nongame Species Conservation Act of 1973 (NSSA 23:2A-13 et. seq.): the list of endangered species (N.J.A.C. 7:25-4.13) and the list defining status of indigenous, nongame wildlife species of New Jersey (N.J.A.C. 7:25-4.17(a)). The status of animal species is determined by the Nongame and Endangered Species Program (ENSP). The state status codes and definitions provided reflect the most recent lists that were revised in the New Jersey Register, Monday, June 3, 1991.

- D Declining species-a species which has exhibited a continued decline in population numbers over the years.
- E Endangered species-an endangered species is one whose prospects for survival within the state are in immediate danger due to one or many factors - a loss of habitat, over exploitation, predation, competition, disease. An endangered species requires immediate assistance or extinction will probably follow.
- EX Extirpated species-a species that formerly occurred in New Jersey, but is not now known to exist within the state.
- I Introduced species-a species not native to New Jersey that could not have established itself here without the assistance of man.
- INC Increasing species-a species whose population has exhibited a significant increase, beyond the normal range of its life cycle, over a long term period.
- T Threatened species-a species that may become endangered if conditions surrounding the species begin to or continue to deteriorate.
- P Peripheral species-a species whose occurrence in New Jersey is at the extreme edge of its present natural range.
- S Stable species-a species whose population is not undergoing any long-term increase/decrease within its natural cycle.
- U Undetermined species-a species about which there is not enough information available to determine the status.

Status for animals separated by a slash(/) indicate a dual status. First status refers to the state breeding population, and the second status refers to the migratory or winter population.

Plant taxa listed as endangered are from New Jersey's official Endangered Plant Species List N.J.S.A. 13:1B-15.151 et seq.

- E Native New Jersey plant species whose survival in the State or nation is in jeopardy.

REGIONAL STATUS CODES FOR PLANTS

- LP Indicates taxa listed by the Pinelands Commission as endangered or threatened within their legal jurisdiction. Not all species currently tracked by the Pinelands Commission are tracked by the Natural Heritage Program. A complete list of endangered and threatened Pineland species is included in the New Jersey Pinelands Comprehensive Management Plan.

EXPLANATION OF GLOBAL AND STATE ELEMENT RANKS

The Nature Conservancy has developed a ranking system for use in identifying elements (rare species and natural communities) of natural diversity most endangered with extinction. Each element is ranked according to its global, national, and state (or subnational in other countries) rarity. These ranks are used to prioritize conservation work so that the most endangered elements receive attention first. Definitions for element ranks are after The Nature Conservancy (1982: Chapter 4, 4.1-1 through 4.4.1.3-3).

GLOBAL ELEMENT RANKS

- G1 Critically imperiled globally because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.
- G2 Imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.
- G3 Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g., a single western state, a physiographic region in the East) or because of other factors making it vulnerable to extinction throughout its range; with the number of occurrences in the range of 21 to 100.
- G4 Apparently secure globally; although it may be quite rare in parts of its range, especially at the periphery.
- G5 Demonstrably secure globally; although it may be quite rare in parts of its range, especially at the periphery.
- GH Of historical occurrence throughout its range i.e., formerly part of the established biota, with the expectation that it may be rediscovered.
- GU Possibly in peril range-wide but status uncertain; more information needed.
- GX Believed to be extinct throughout range (e.g., passenger pigeon) with virtually no likelihood that it will be rediscovered.
- G? Species has not yet been ranked.

STATE ELEMENT RANKS

- S1 Critically imperiled in New Jersey because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres). Elements so ranked are often restricted to very specialized conditions or habitats and/or restricted to an extremely small geographical area of the state. Also included are elements which were formerly more abundant, but because of habitat destruction or some other critical factor of its biology, they have been demonstrably reduced in abundance. In essence, these are elements for which, even with intensive searching, sizable additional occurrences are unlikely to be discovered.

- S2 Imperiled in New Jersey because of rarity (6 to 20 occurrences). Historically many of these elements may have been more frequent but are now known from very few extant occurrences, primarily because of habitat destruction. Diligent searching may yield additional occurrences.
- S3 Rare in state with 21 to 100 occurrences (plant species in this category have only 21 to 50 occurrences). Includes elements which are widely distributed in the state but with small populations/acreage or elements with restricted distribution, but locally abundant. Not yet imperiled in state but may soon be if current trends continue. Searching often yields additional occurrences.
- S4 Apparently secure in state, with many occurrences.
- S5 Demonstrably secure in state and essentially ineradicable under present conditions.
- SA Accidental in state, including species (usually birds or butterflies) recorded once or twice or only at very great intervals, hundreds or even thousands of miles outside their usual range; a few of these species may even have bred on the one or two occasions they were recorded; examples include European strays or western birds on the East Coast and vice-versa.
- SE Elements that are clearly exotic in New Jersey including those taxa not native to North America (introduced taxa) or taxa deliberately or accidentally introduced into the State from other parts of North America (adventive taxa). Taxa ranked SE are not a conservation priority (viable introduced occurrences of G1 or G2 elements may be exceptions).
- SH Elements of historical occurrence in New Jersey. Despite some searching of historical occurrences and/or potential habitat, no extant occurrences are known. Since not all of the historical occurrences have been field surveyed, and unsearched potential habitat remains, historically ranked taxa are considered possibly extant, and remain a conservation priority for continued field work.
- SP Element has potential to occur in New Jersey, but no occurrences have been reported.
- SR Elements reported from New Jersey, but without persuasive documentation which would provide a basis for either accepting or rejecting the report. In some instances documentation may exist, but as of yet, its source or location has not been determined.
- SRF Elements erroneously reported from New Jersey, but this error persists in the literature.
- SU Elements believed to be in peril but the degree of rarity uncertain. Also included are rare taxa of uncertain taxonomical standing. More information is needed to resolve rank.
- SX Elements that have been determined or are presumed to be extirpated from New Jersey. All historical occurrences have been searched and a reasonable search of potential habitat has been completed. Extirpated taxa are not a current conservation priority.
- SXC Elements presumed extirpated from New Jersey, but native populations collected from the wild exist in cultivation.
- SZ Not of practical conservation concern in New Jersey, because there are no definable occurrences, although the taxon is native and appears regularly in the state. An SZ rank will generally be used for long distance migrants whose occurrences during their migrations are too irregular (in terms of repeated visitation to the same locations), transitory, and dispersed to be reliably identified, mapped and protected. In other words, the migrant regularly passes through the state, but enduring, mappable element occurrences cannot be defined.

Typically, the SZ rank applies to a non-breeding population (N) in the state – for example, birds on migration. An SZ rank may in a few instances also apply to a breeding population (B), for example certain lepidoptera which regularly die out every year with no significant return migration.

Although the SZ rank typically applies to migrants, it should not be used indiscriminately. Just because a species is on migration does not mean it receives an SZ rank. SZ will only apply when the migrants occur in an irregular, transitory and dispersed manner.

B Refers to the breeding population of the element in the state.

N Refers to the non-breeding population of the element in the state.

T Element ranks containing a "T" indicate that the infraspecific taxon is being ranked differently than the full species. For example *Stachys palustris* var. *homotricha* is ranked "GST? SH" meaning the full species is globally secure but the global rarity of the var. *homotricha* has not been determined; in New Jersey the variety is ranked historic.

Q Elements containing a "Q" in the global portion of its rank indicates that the taxon is of questionable, or uncertain taxonomical standing, e.g., some authors regard it as a full species, while others treat it at the subspecific level.

.1 Elements documented from a single location.

Note: To express uncertainty, the most likely rank is assigned and a question mark added (e.g., G2?). A range is indicated by combining two ranks (e.g., G1G2, S1S3).

IDENTIFICATION CODES

These codes refer to whether the identification of the species or community has been checked by a reliable individual and is indicative of significant habitat.

Y Identification has been verified and is indicative of significant habitat.

BLANK Identification has not been verified but there is no reason to believe it is not indicative of significant habitat.

? Either it has not been determined if the record is indicative of significant habitat or the identification of the species or community may be confusing or disputed.

Revised September 1998

303227



FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES IN NEW JERSEY

An **ENDANGERED** species is any species that is in danger of extinction throughout all or a significant portion of its range.

A **THREATENED** species is any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

	COMMON NAME	SCIENTIFIC NAME	STATUS
FISHES	Shortnose sturgeon*	<i>Acipenser brevirostrum</i>	E
REPTILES	Bog turtle	<i>Clemmys muhlenbergii</i>	T
	Atlantic Ridley turtle*	<i>Lepidochelys kempii</i>	E
	Green turtle*	<i>Chelonia mydas</i>	T
	Hawksbill turtle*	<i>Eretmochelys imbricata</i>	E
	Leatherback turtle*	<i>Dermochelys coriacea</i>	E
	Loggerhead turtle*	<i>Caretta caretta</i>	T
BIRDS	Bald eagle	<i>Haliaeetus leucocephalus</i>	T
	Piping plover	<i>Charadrius melanotos</i>	T
	Roseate tern	<i>Sterna dougallii dougallii</i>	E
MAMMALS	Eastern cougar	<i>Felis concolor couguar</i>	E+
	Indiana bat	<i>Myotis sodalis</i>	E
	Gray wolf	<i>Canis lupus</i>	E+
	Delmarva fox squirrel	<i>Sciurus niger cinereus</i>	E+
	Blue whale*	<i>Balaenoptera musculus</i>	E
	Finback whale*	<i>Balaenoptera physalus</i>	E
	Humpback whale*	<i>Megaptera novaeangliae</i>	E
	Right whale*	<i>Balaena glacialis</i>	E
	Sel whale*	<i>Balaenoptera borealis</i>	E
	Sperm whale*	<i>Physeter macrocephalus</i>	E

	COMMON NAME	SCIENTIFIC NAME	STATUS
INVERTEBRATES	Dwarf wedgemussel	<i>Alasmidonta heterodon</i>	E
	Northeastern beach tiger beetle	<i>Cicindela dorsalis dorsalis</i>	T
	Mitchell saytr butterfly	<i>Neonympha m. mitchellii</i>	E+
	American burying beetle	<i>Nicrophorus americanus</i>	E+
PLANTS	Small whorled pogonia	<i>Isotria medeoloides</i>	T
	Swamp pink	<i>Helonias bullata</i>	T
	Knieskern's beaked-rush	<i>Rhynchospora knieskernii</i>	T
	American chaffseed	<i>Schwalbea americana</i>	E
	Sensitive joint-vetch	<i>Aeschynomene virginica</i>	T
	Seabeach amaranth	<i>Amaranthus pumilus</i>	T

STATUS:			
E	endangered species	PE	proposed endangered
T	threatened species	PT	proposed threatened
+	presumed extirpated**		

* Except for sea turtle nesting habitat, principal responsibility for these species is vested with the National Marine Fisheries Service.

** Current records indicate the species does not presently occur in New Jersey, although the species did occur in the State historically.

Note: for a complete listing of Endangered and Threatened Wildlife and Plants, refer to 50 CFR 17.11 and 17.12.

For further information, please contact:

U.S. Fish and Wildlife Service
 New Jersey Field Office
 927 N. Main Street, Building D
 Pleasantville, New Jersey 08232
 Phone: (609) 646-9310
 Fax: (609) 646-0352

Revised 12/06/00



FEDERAL CANDIDATE SPECIES IN NEW JERSEY

CANDIDATE SPECIES are species that appear to warrant consideration for addition to the federal List of Endangered and Threatened Wildlife and Plants. Although these species receive no substantive or procedural protection under the Endangered Species Act, the U.S. Fish and Wildlife Service encourages federal agencies and other planners to give consideration to these species in the environmental planning process.

SPECIES	SCIENTIFIC NAME
Bog asphodel	<i>Narthecium americanum</i>
Hirst's panic grass	<i>Panicum hirstii</i>

Note: For complete listings of taxa under review as candidate species, refer to Federal Register Vol. 64, No. 205, October 25, 1999 (Endangered and Threatened Wildlife and Plants; Review of Plant and Animal Taxa that are Candidates for Listing as Endangered or Threatened Species).

Revised 11/99

FEDERAL CANDIDATE AND STATE-LISTED SPECIES

Candidate species are species under consideration by the U.S. Fish and Wildlife Service (Service) for possible inclusion on the List of Endangered and Threatened Wildlife and Plants. Although these species receive no substantive or procedural protection under the Endangered Species Act, the Service encourages federal agencies and other planners to consider federal candidate species in project planning.

The New Jersey Natural Heritage Program maintains the most up-to-date information on federal candidate species and State-listed species in New Jersey and may be contacted at the following address:

Mr. Thomas Breden
Natural Heritage Program
Division of Parks and Forestry
P.O. Box 404
Trenton, New Jersey 08625
(609) 984-0097

Additionally, information on New Jersey's State-listed wildlife species may be obtained from the following office:

Dr. Larry Niles
Endangered and Nongame Species Program
Division of Fish and Wildlife
P.O. Box 400
Trenton, New Jersey 08625
(609) 292-9400

If information from either of the aforementioned sources reveals the presence of any federal candidate species within a project area, the Service should be contacted to ensure that these species are not adversely affected by project activities.

Revised 08/00

303231

20 DEC 2002

GENERAL VICINITY OF PROJECT SITE
 RARE SPECIES AND NATURAL COMMUNITIES PRESENTLY RECORDED IN
 THE NEW JERSEY NATURAL HERITAGE DATABASE
 EXCLUDING RECORDS USED FOR THE LANDSCAPE PROJECT

NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	REGIONAL GRANK	SRANK	DATE OBSERVED	IDENT.	
*** Vertebrates								
CLEMMYS MUHLENBERGII	BOG TURTLE	LT	E	G3	S2	1906-??-??	Y	
FALCO PEREGRINUS	PEREGRINE FALCON		E	G4	S1B, S?N	1993-SUMMER	Y	
FALCO PEREGRINUS	PEREGRINE FALCON		E	G4	S1B, S?N	1992-SUMMER	Y	
*** Ecosystems								
FRESHWATER TIDAL MARSH COMPLEX				G4?	S3?	1999-11-10	Y	
*** Invertebrates								
ALASMIDONTA UNDULATA	TRIANGLE FLOATER	T		G4	S3	????-??-??	Y	
LAMPSILIS CARIOSA	YELLOW LAMPMUSSEL	T		G3G4	S1	????-??-??	Y	
LAMPSILIS RADIATA	EASTERN LAMPMUSSEL	T		G5	S3	????-??-??	Y	
LAMPSILIS RADIATA	EASTERN LAMPMUSSEL	T		G5	S3	????-??-??	Y	
LAMPSILIS RADIATA	EASTERN LAMPMUSSEL	T		G5	S3	????-??-??	Y	
LAMPSILIS RADIATA	EASTERN LAMPMUSSEL	T		G5	S3	1909-??-??	Y	
LEPTODEA OCHRACEA	TIDEWATER MUCKET	T		G4	S1	????-??-??	Y	
LEPTODEA OCHRACEA	TIDEWATER MUCKET	T		G4	S1	????-??-??	Y	
LEPTODEA OCHRACEA	TIDEWATER MUCKET	T		G4	S1	????-??-??	Y	
LEPTODEA OCHRACEA	TIDEWATER MUCKET	T		G4	S1	1999-11-10	Y	
LIGUMIA NASUTA	EASTERN POND MUSSEL	T		G4G5	S1	1999-11-10	Y	
LIGUMIA NASUTA	EASTERN POND MUSSEL	T		G4G5	S1	????-??-??	Y	
PIERIS VIRGINIENSIS	WEST VIRGINIA WHITE			G3G4	SH	????-??-??	Y	
POLYGONIA PROGNE	GRAY COMMA			G5	SH	????-04-24	Y	
PONTIA PROTODICE	CHECKERED WHITE	T		G4	S1	????-??-??	Y	
*** Vascular plants								
AESCHYNOMENE VIRGINICA	SENSITIVE JOINT-VETCH	LT	E	LP	G2	S1	1874-10-??	Y
CACALIA ATRIPLICIFOLIA	PALE INDIAN PLANTAIN		E	G4G5	S1	1864-07-10	Y	
CACALIA ATRIPLICIFOLIA	PALE INDIAN PLANTAIN		E	G4G5	S1	1879-09-20	Y	

303232

20 DEC 2002

GENERAL VICINITY OF PROJECT SITE
 RARE SPECIES AND NATURAL COMMUNITIES PRESENTLY RECORDED IN
 THE NEW JERSEY NATURAL HERITAGE DATABASE
 EXCLUDING RECORDS USED FOR THE LANDSCAPE PROJECT

NAME	COMMON NAME	FEDERAL	STATE	REGIONAL GRANK.	S RANK	DATE OBSERVED	IDENT.	
		STATUS	STATUS	STATUS				
CACALIA ATRIPLOCIFOLIA	PALE INDIAN PLANTAIN	E		G4G5	S1	1862-08-??	Y	
ASCLEPIAS RUBRA	RED MILKWEED		LP	G4G5	S2	1864-07-??	Y	
ASTER RADULA	LOW ROUGH ASTER		E	G5	S1	1885-08-28	Y	
BIDENS BIDENTOIDES	ESTUARY BURR-MARIGOLD			G3	S2	1897-09-??	Y	
BIDENS BIDENTOIDES	ESTUARY BURR-MARIGOLD			G3	S2	1895-09-14	Y	
BIDENS BIDENTOIDES	ESTUARY BURR-MARIGOLD			G3	S2	1971-09-22	Y	
BOTRYCHIUM ONEIDENSE	BLUNT-LOBE GRAPE FERN			G4Q	S2	1867-10-13	Y	
CALLITRICHE PALUSTRIS	MARSH WATER-STARWORT			G5	S2	1871-04-30	Y	
CALYSTEGIA SPITHAMEA	ERECT BINDWEED	E		G4G5T4T5	S1	1901-06-05	Y	
CAREX BARRATTII	BARRATT'S SEDGE		LP	G4	S4	1868-06-08	Y	
CAREX UTRICULATA	BOTTLE-SHAPED SEDGE			G5	S2	1868-07-16	Y	
CHENOPodium RUBRUM	RED GOOSEFOOT	E		G5	S1	1898-??-??	Y	
COELOGLOSSUM VIRIDE VAR VIRESCENTS	LONG-BRACT GREEN ORCHID			G5T5	S2	1867-05-??	Y	
CUSCUTA POLYGONORUM	SMARTWEED DODDER			G5	S2	1903-08-15	Y	
CYPERUS LANCASTRIENSIS	LANCASTER FLAT SEDGE	E		G5	S1	18??-??-??	Y	
CYPERUS LANCASTRIENSIS	LANCASTER FLAT SEDGE	E		G5	S1	1897-08-25	Y	
CYPERUS LANCASTRIENSIS	LANCASTER FLAT SEDGE	E		G5	S1	1934-10-10	Y	
CYPERUS RETROFRACTUS	ROUGH FLATESEDGE	E		G5	SH	1908-09-12	Y	
DRABA REPTANS	CAROLINA WHITLOW-GRASS	E		G5	SH	1888-05-12	Y	
ERIOCAULON PARKERI	PARKER'S PIPEWORT			G3	S2	1849-09-03	Y	
ERIOCAULON PARKERI	PARKER'S PIPEWORT			G3	S2	1879-09-??	Y	
ERIOCAULON PARKERI	PARKER'S PIPEWORT			G3	S2	1918-09-19	Y	
ERIOCAULON PARKERI	PARKER'S PIPEWORT			G3	S2	1870-08-??	Y	
ERIOCAULON PARKERI	PARKER'S PIPEWORT			G3	S2	1884-08-11	Y	
EUPATORIUM CAPILLIFOLIUM	DOG-FENNEL THOROUGHWORT	E		G5	S2	1866-10-27	Y	
GENTIANA AUTUMNALIS	PINE BARREN GENTIAN		LP	G3	S3	1878-09-??	Y	
GLYCERIA GRANDIS	AMERICAN MANNA GRASS	E		G5T5	S2	1917-09-21	?	
HELONIAS BULLATA	SWAMP-PINK	LT	E	LP	G3	S3	1896-05-23	Y

303233

20 DEC 2002

GENERAL VICINITY OF PROJECT SITE
 RARE SPECIES AND NATURAL COMMUNITIES PRESENTLY RECORDED IN
 THE NEW JERSEY NATURAL HERITAGE DATABASE
 EXCLUDING RECORDS USED FOR THE LANDSCAPE PROJECT

NAME	COMMON NAME	FEDERAL	STATE	REGIONAL	RANK	S RANK	DATE OBSERVED	IDENT.
		STATUS	STATUS	GRANK	STATUS			
HETERANTHERA MULTIFLORA	BOUQUET MUD-PLANTAIN			G4	S2		1897-08-28	Y
HETERANTHERA MULTIFLORA	BOUQUET MUD-PLANTAIN			G4	S2		1897-07-15	Y
HETERANTHERA MULTIFLORA	BOUQUET MUD-PLANTAIN			G4	S2		1926-07-24	Y
HYDRASTIS CANADENSIS	GOLDEN SEAL	E		G4	SH.1		1852-05-05	Y
LEMNA PERPUSILLA	MINUTE DUCKWEED	E		G5	S1		1873-09-03	Y
LINUM INTERCURSUM	SANDPLAIN FLAX	E		G4	S1		18??-??-??	Y
HEMICARPHA MICRANTHA	SMALL-FLOWER HALFCHAFF SEDGE	E		G4	S1		1866-10-26	Y
HEMICARPHA MICRANTHA	SMALL-FLOWER HALFCHAFF SEDGE	E		G4	S1		18??-??-??	Y
MICRANTHEMUM MICRANTHEMOIDES	NUTTALL'S MUDWORT	E		GH	SH		1923-09-11	Y
MICRANTHEMUM MICRANTHEMOIDES	NUTTALL'S MUDWORT	E		GH	SH		1879-09-??	Y
MICRANTHEMUM MICRANTHEMOIDES	NUTTALL'S MUDWORT	E		GH	SH		1868-07-19	Y
RHYNCHOSPORA PALLIDA	PALE BEAKED-RUSH			G3	S3		1900-09-09	Y
SCIRPUS MARITIMUS	SALTMARSH BULRUSH	E		G5	SH		1884-07-10	Y
SPIRANTHES ODORATA	FRAGRANT LADIES'-TRESSES			G5	S2		18??-??-??	Y
THASPIUM BARBINODE	HAIRY-JOINT MEADOW-PARSNIP			G5	SX		1864-??-??	Y
VALERIANELLA RADIIATA	BEAKED CORNSALAD	E		G5	S1		1871-05-13	Y

66 Records Processed

303234

CAMDEN COUNTY
RARE SPECIES AND NATURAL COMMUNITIES PRESENTLY RECORDED IN
THE NEW JERSEY NATURAL HERITAGE DATABASE

NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	REGIONAL STATUS	GRANK	SRANK
*** Vertebrates						
ARDEA HERODIAS	GREAT BLUE HERON		S/S	G5	S2B, S4N	
CLEMMYS MUHLENBERGII	BOG TURTLE	LT	E	G3	S2	
CROTALUS HORRIDUS HORRIDUS	TIMBER RATTLESNAKE		E	G4T4	S2	
FALCO PEREGRINUS	PEREGRINE FALCON		E	G4	S1B, S?N	
HYLA ANDERSONII	PINE BARRENS TREEFROG		E	G4	S3	
MELANERPES ERYTHROCEPHALUS	RED-HEADED WOODPECKER		T/T	G5	S2B, S2N	
PITUOPHIS MELANOLEUCUS	NORTHERN PINE SNAKE		T	G4T4	S3	
MELANOLEUCUS						
*** Ecosystems						
COASTAL PLAIN INTERMITTENT POND	VERNAL POND			G3?	S2S3	
FRESHWATER TIDAL MARSH COMPLEX	FRESHWATER TIDAL MARSH COMPLEX			G4?	S3?	
PITCH PINE LOWLAND FOREST	PITCH PINE LOWLAND FOREST			G3	S3	
*** Invertebrates						
ANAX LONGIPES	COMET DARNER			G5	S2S3	
CALLOPHRYS IRUS	FROSTED ELFIN		T	G3	S2S3	
CELITHEMIS MARTHA	MARTHA'S PENNANT			G4	S3S4	
ENALLAGMA PICTUM	SCARLET BLUET			G3	S3	
ENALLAGMA RECURVATUM	PINE BARRENS BLUET			G3	S3	
EPITHECA SPINOSA	ROBUST BASKETTAIL			G4	S1	
ERYNNIS MARTIALIS	MOTTLED DUSKY WING			G3G4	SH	
GOMPHUS APOMYIUS	BANNER CLUBTAIL			G4	S1	
HELICODISCUS SINGLEYANUS	SMOOTH COIL			G4G5	S2S3	
HESPERIA ATTALUS SLOSSONAE	DOTTED SKIPPER			G3G4T3	S2S3	
LAMPSILIS RADIATA	EASTERN LAMPMUSSEL		T	G5	S3	
LEPTODEA OCHRACEA	TIDEWATER MUCKET		T	G4	S1	

27 JUN 2002

CAMDEN COUNTY
RARE SPECIES AND NATURAL COMMUNITIES PRESENTLY RECORDED IN
THE NEW JERSEY NATURAL HERITAGE DATABASE

NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	REGIONAL STATUS	GRANK	SRANK
<i>LIBELLULA AXILENA</i>	BAR-WINGED SKIMMER				G5	S2BS3B,SZ
					N	
<i>LIGUMIA NASUTA</i>	EASTERN POND MUSSEL		T		G4G5	S1
<i>NICROPHORUS AMERICANUS</i>	AMERICAN BURYING BEETLE	LE	E		G2G3	SH
<i>PIERIS VIRGINIENSIS</i>	WEST VIRGINIA WHITE				G3G4	SH
<i>POLYGONIA PROGNE</i>	GRAY COMMA				G5	SH
<i>PONTIA PROTODICE</i>	CHECKERED WHITE		T		G4	S1
<i>SPARTINIPHAGA CARTERAE</i>	CARTER'S NOCTUID MOTH				G2G3	S2

*** Vascular plants

<i>AESCHYNOMENE VIRGINICA</i>	SENSITIVE JOINT-VETCH	LT	E	LP	G2	S1
<i>AGASTACHE SCROPHULARII FOLIA</i>	PURPLE GIANT-HYSSOP				G4	S2
<i>AMIANTHIUM MUSCITOXICUM</i>	FLY POISON				G4G5	S2
<i>ARISTIDA DICHOTOMA VAR CURTISSII</i>	CURTISS' THREE-AWN GRASS				G5T5	S2
<i>ARISTIDA LANOSA</i>	WOOLLY THREE-AWN GRASS		E		G5	S1
<i>ARISTIDA VIRGATA</i>	WAND-LIKE THREE-AWN GRASS				G5T4T5	S2
<i>ARNOGLOSSUM MUEHLENBERGII</i>	GREAT INDIAN PLANTAIN				G4	SX.1
<i>ASCLEPIAS RUBRA</i>	RED MILKWEED			LP	G4G5	S2
<i>ASCLEPIAS VARIEGATA</i>	WHITE MILKWEED				G5	S2
<i>ASCLEPIAS VERTICILLATA</i>	WHORLED MILKWEED				G5	S2
<i>ASTER RADULA</i>	LOW ROUGH ASTER		E		G5	S1
<i>BIDENS BIDENTOIDES</i>	ESTUARY BURR-MARIGOLD				G3	S2
<i>BOTRYCHIUM ONEIDENSE</i>	BLUNT-LOBE GRAPE FERN				G4Q	S2
<i>CACALIA ATRIPLICIFOLIA</i>	PALE INDIAN PLANTAIN		E		G4G5	S1
<i>CALAMOVILFA BREVIPILIS</i>	PINE BARREN REEDGRASS			LP	G4	S4
<i>CALYSTEGIA SPITHAMEA</i>	ERECT BINDWEED		E		G4G5T4T5	S1
<i>CAREX AQUATILIS</i>	WATER SEDGE		E		G5	S1
<i>CAREX BARRATTII</i>	BARRATT'S SEDGE			LP	G4	S4
<i>CAREX CUMULATA</i>	CLUSTERED SEDGE		E		G4?	SH

303236

CAMDEN COUNTY
RARE SPECIES AND NATURAL COMMUNITIES PRESENTLY RECORDED IN
THE NEW JERSEY NATURAL HERITAGE DATABASE

NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	REGIONAL STATUS	GRANK	SRANK
CAREX MITCHELLIANA	MICHELL'S SEDGE				G3G4	S2
CAREX VITRICULATA	BOTTLE-SHAPED SEDGE				G5	S2
CASTILLEJA COCCINEA	SCARLET INDIAN-PAINTBRUSH				G5	S2
CERCIS CANADENSIS	REDBUD	E			G5T5	S1
CHENOPodium RUBRUM	RED GOOSEFOOT	E			G5	S1
COELOGLOSSUM VIRIDE VAR VIRESSENS	LONG-BRACT GREEN ORCHID				G5T5	S2
COMMELINA ERECTA	SLENDER DAYFLOWER	E			G5T5	SH.1
COREOPSIS ROSEA	ROSE-COLOR COREOPSIS		LP	G3	S2	
CROTON WILLDENOWII	ELLIPTICAL RUSHFOIL		LP	G5	S2	
CUSCUTA POLYGONORUM	SMARTWEED DODDER				G5	S2
CYPERUS ENGELMANNII	ENGELMANN'S FLAT SEDGE				G4Q	S2
CYPERUS LANCASTRIENSIS	LANCASTER FLAT SEDGE	E			G5	S1
CYPERUS RETROFRACTUS	ROUGH FLATSEDGE	E			G5	SH
DESMODIUM STRICTUM	PINELAND TICK-TREFOIL		LP	G4	S2	
DESMODIUM VIRIDIFLORUM	VELVETY TICK-TREFOIL				G5?	S2
DIODIA VIRGINIANA	LARGER BUTTONWEED	E			G5T5	S1
DOELLINGERIA INFIRMA	CORNEL-LEAF ASTER				G5	S2
DRABA REPTANS	CAROLINA WHITLOW-GRASS	E			G5	SH
EPILOBIUM STRICTUM	DOWNTY WILLOWHERB				G5?	S2
ERIOCAULON PARKERI	PARKER'S PIPEWORT				G3	S2
ERIOPHORUM TENELLUM	ROUGH COTTON-GRASS	E			G5	S1
ERYNGIUM YUCCIFOLIUM VAR YUCCIFOLIUM	TALL RATTLESNAKE-MASTER				G5T5	SX
EUPATORIUM CAPILLIFOLIUM	DOG-FENNEL THOROUGHWORT	E			G5	S2
EUPATORIUM HYSSOPIFOLIUM VAR LACINIATUM	TORREY'S BONESET				G5T4T5	S2
EUPATORIUM RESINOSUM	PINE BARREN BONESET	E	LP	G3	S2	
GENTIANA AUTUMNALIS	PINE BARREN GENTIAN		LP	G3	S3	
GLYCERIA GRANDIS	AMERICAN MANNA GRASS	E			G5T5	S2

27 JUN 2002

CAMDEN COUNTY
RARE SPECIES AND NATURAL COMMUNITIES PRESENTLY RECORDED IN
THE NEW JERSEY NATURAL HERITAGE DATABASE

NAME	COMMON NAME	FEDERAL	STATE	REGIONAL	GRANK	S RANK
		STATUS	STATUS	STATUS		
<i>GNAPHALIUM HELLERI</i>	SMALL EVERLASTING		E		G4G5T3?	SH
<i>HELONIAS BULLATA</i>	SWAMP-PINK	LT	E	LP	G3	S3
<i>HEMICARPHA MICRANTHA</i>	SMALL-FLOWER HALFCHAFF SEDGE		E		G4	S1
<i>HETERANTHERA MULTIFLORA</i>	BOUQUET MUD-PLANTAIN				G4	S2
<i>HYDRASTIS CANADENSIS</i>	GOLDEN SEAL		E		G4	SH.1
<i>JUNCUS CAESARIENSIS</i>	NEW JERSEY RUSH		E	LP	G2	S2
<i>JUNCUS TORREYI</i>	TORREY'S RUSH		E		G5	S1
<i>KUHNIA EUPATORIOIDES</i>	FALSE BONESET		E		G5T5	S1
<i>LEMNA PERPUSILLA</i>	MINUTE DUCKWEED		E		G5	S1
<i>LIMOSELLA SUBULATA</i>	AWL-LEAF MUDWORT		E		G4G5	S1
<i>LINUM INTERCURSUM</i>	SANDPLAIN FLAX		E		G4	S1
<i>LISTERA AUSTRALIS</i>	SOUTHERN TWAYBLADE			LP	G4	S2
<i>MELANTHİUM VIRGINICUM</i>	VIRGINIA BUNCHFLOWER		E		G5	S1
<i>MICRANTHEMUM MICRANTHEMOIDES</i>	NUTTALL'S MUDWORT		E		GH	SH
<i>MUhlenbergia TORREYANA</i>	PINE BARREN SMOKE GRASS			LP	G3	S3
<i>MYRIOPHYLLUM TENELLUM</i>	SLENDER WATER-MILFOIL		E		G5	S1
<i>NELUMBO LUTEA</i>	AMERICAN LOTUS		E		G4	S1
<i>NUPHAR MICROPHYLLUM</i>	SMALL YELLOW POND-LILY		E		G5T4T5	SH
<i>ONOSMODIUM VIRGINIANUM</i>	VIRGINIA FALSE-GROMWELL		E		G4	S1
<i>PLANTAGO PUSILLA</i>	DWARF PLANTAIN		E		G5	SH
<i>PLATANTHERA FLAVA VAR FLAVA</i>	SOUTHERN REIN ORCHID		E		G4T4?Q	S1
<i>PLUCHEA FOETIDA</i>	STINKING FLEABANE		E		G5T5	S1
<i>POLYGALA INCARNATA</i>	PINK MILKWORT		E		G5	SH
<i>PRUNUS ANGUSTIFOLIA</i>	CHICKASAW PLUM		E		G5T4T5	S2
<i>PUCCINELIA FASCICULATA</i>	SALTMARSH ALKALI GRASS				G3G5	S2
<i>PYCANTHEMUM CLINOPODIOIDES</i>	BASIL MOUNTAIN-MINT		E		G2	S1
<i>RHYNCHOSPORA GLOBULARIS</i>	COARSE GRASS-LIKE BEAKED-RUSH		E		G5?	S1
<i>RHYNCHOSPORA INUNDATA</i>	SLENDER HORNED-RUSH			LP	G3G4	S2
<i>RHYNCHOSPORA KNIESKERNII</i>	KNIESKERN'S BEAKED-RUSH	LT	E	LP	G1	S1
<i>RHYNCHOSPORA PALLIDA</i>	PALE BEAKED-RUSH				G3	S3

303238

CAMDEN COUNTY
 RARE SPECIES AND NATURAL COMMUNITIES PRESENTLY RECORDED IN
 THE NEW JERSEY NATURAL HERITAGE DATABASE

NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	REGIONAL STATUS	GRANK	SRANK
<i>SAGITTARIA TERES</i>	SLENDER ARROWHEAD		E		G3	S1
<i>SCHEUCHZERIA PALUSTRIS</i>	ARROW-GRASS		E		G5T5	SH
<i>SCHIZAEA PUSILLA</i>	CURLY GRASS FERN			LP	G3	S3
<i>SCHWALBEA AMERICANA</i>	CHAFFSEED	LE	E	LP	G2	S1
<i>SCIRPUS LONGII</i>	LONG'S WOOLGRASS		E	LP	G2	S2
<i>SCIRPUS MARITIMUS</i>	SALTMARSH BULRUSH		E		G5	SH
<i>SPIRANTHES ODORATA</i>	FRAGRANT LADIES'-TRESSES				G5	S2
<i>STELLARIA PUBERA</i>	STAR CHICKWEED		E		G5	SH
<i>THASPIUM BARBINODE</i>	HAIRY-JOINT MEADOW-PARSNIP				G5	SX
<i>VERBENA SIMPLEX</i>	NARROW-LEAF VERVAIN		E		G5	S1
<i>VULPIA ELLIOTEA</i>	SQUIRREL-TAIL SIX-WEEKS GRASS		E		G5	SH
<i>XYRIS FIMBRIATA</i>	FRINGED YELLOW-EYED-GRASS		E		G5	S1

117 Records Processed

303239

Attachment C

Calculations of BCFs for Organic Chemicals

Attachment C
Calculated Soil-Plant BCF Values

Equation: $\log Bv = 1.588 - (0.578) (\log Kow)$

Bv = Soil-to-plant BCF (unitless; dry-weight basis)

Kow = Octanol-water partitioning coefficient (unitless)

Chemical	Log Kow	Log Kow Source	Soil-Plant BCF (Bv)(dry weight)
4,4'-DDE	6.76	USEPA 1995	0.005
4,4'-DDT	6.53	USEPA 1995	0.007
Aldrin	6.5	USEPA 1995	0.007
alpha-Chlordane	6.32	USEPA 1995	0.009
Aroclor-1016	5.6	Sample et al. 1996	0.022
Aroclor-1221	4.7	Jones et al. 1997	0.074
Aroclor-1232	5.1	Jones et al. 1997	0.044
Aroclor-1242	5.6	Jones et al. 1997	0.022
Aroclor-1248	6.2	Jones et al. 1997	0.010
Aroclor-1254	6.5	Jones et al. 1997	0.007
Aroclor-1260	6.8	Jones et al. 1997	0.005
Dieldrin	5.37	USEPA 1995	0.031
Endosulfan I	3.83	USEPA 1995	0.237
Endosulfan II	4.52	USEPA 1995	0.095
Endosulfan sulfate	3.7	USEPA 1996	0.281
Endrin	5.06	USEPA 1995	0.046
Endrin aldehyde	4	USEPA 1995	0.189
Endrin ketone	4.99	SRC 2003 (estimated)	0.189
gamma-Chlordane	6.32	USEPA 1995	0.009
Heptachlor	6.26	USEPA 1995	0.009
Methoxychlor	5.08	USEPA 1995	0.045
Toxaphene	5.5	USEPA 1995	0.026
1,2-Dichlorobenzene	3.43	USEPA 1995	0.403
1,3-Dichlorobenzene	3.5	USEPA 1996	0.367
2,4,5-Trichlorophenol	3.9	USEPA 1995	0.216
2,4,6-Trichlorophenol	3.7	USEPA 1995	0.281
2,4-Dichlorophenol	3.08	USEPA 1995	0.642
2,4-Dimethylphenol	2.36	USEPA 1995	1.675
2,4-Dinitrophenol	1.55	USEPA 1995	4.922
2,4-Dinitrotoluene	2.01	USEPA 1995	2.668
2,6-Dinitrotoluene	1.87	USEPA 1995	3.215
2-Chloronaphthalene	4.1	USEPA 1996	0.165
2-Chlorophenol	2.15	USEPA 1995	2.215
2-Methylnaphthalene	3.9	USEPA 1996	0.216
2-Nitroaniline	1.9	USEPA 1996	3.089
2-Nitrophenol	1.8	USEPA 1996	3.529
3,3'-Dichlorobenzidine	3.51	USEPA 1995	0.362
3-Nitroaniline	1.4	USEPA 1996	6.009
4-Bromophenyl-phenylether	5	USEPA 1995	0.050
4-Chloroaniline	1.9	USEPA 1996	3.301

Attachment C
Calculated Soil-Plant BCF Values

Equation: $\log B_v = 1.588 - (0.578) (\log K_{ow})$

B_v = Soil-to-plant BCF (unitless; dry-weight basis)

K_{ow} = Octanol-water partitioning coefficient (unitless)

Chemical	Log Kow	Log Kow Source	Soil-Plant BCF (B_v)(dry weight)
4-Chlorophenyl-phenylether	4.95	USEPA 1995	0.053
4-Nitroaniline	1.4	USEPA 1996	6.009
4-Nitrophenol	1.9	USEPA 1996	3.089
Acenaphthene	3.92	USEPA 1995	0.210
Acenaphthylene	4.1	USEPA 1996	0.165
Anthracene	4.55	USEPA 1995	0.091
Benzo(a)anthracene	5.7	USEPA 1995	0.020
Benzo(a)pyrene	6.11	USEPA 1995	0.011
Benzo(b)fluoranthene	6.2	USEPA 1995	0.010
Benzo(g,h,i)perylene	6.7	USEPA 1995	0.005
Benzo(k)fluoranthene	6.2	USEPA 1995	0.010
bis(2-Chloroethoxy)methane	0.75	USEPA 1996	14.273
bis(2-Chloroethyl)ether	1.21	USEPA 1995	7.738
bis(2-Ethylhexyl)phthalate	7.3	USEPA 1995	0.002
Butylbenzylphthalate	4.84	USEPA 1995	0.062
Carbazole	3.59	USEPA 1995	0.326
Chrysene	5.7	USEPA 1995	0.020
Dibenz(a,h)anthracene	6.69	USEPA 1995	0.005
Dibenzofuran	4.2	USEPA 1996	0.145
Dimethyl phthalate	1.57	USEPA 1995	4.792
Di-n-octylphthalate	8.06	USEPA 1995	0.001
Fluoranthene	5.12	USEPA 1995	0.043
Fluorene	4.21	USEPA 1995	0.043
Hexachlorobenzene	5.89	USEPA 1995	0.015
Hexachlorobutadiene	4.81	USEPA 1995	0.064
Hexachlorocyclopentadiene	5.39	USEPA 1995	0.030
Hexachloroethane	4	USEPA 1995	0.189
Indeno(1,2,3-cd)pyrene	6.65	USEPA 1995	0.006
Isophorone	1.7	USEPA 1995	4.031
Naphthalene	3.36	USEPA 1995	0.443
Nitrobenzene	1.84	USEPA 1995	3.346
N-Nitroso-di-n-propylamine	1.4	USEPA 1995	6.009
N-Nitrosodiphenylamine	3.16	USEPA 1995	0.578
Phenanthrene	4.55	USEPA 1995	0.091
Phenol	1.48	USEPA 1995	5.402
Pyrene	5.11	USEPA 1995	0.043
1,1,1-Trichloroethane	2.48	USEPA 1995	1.427
1,1,2,2-Tetrachloroethane	2.39	USEPA 1995	1.609
1,1,2-Trichloro-1,2,2-trifluoroethane	3.16	USEPA 1995	0.577
1,1,2-Trichloroethane	2.05	USEPA 1995	2.530

Attachment C
Calculated Soil-Plant BCF Values

Equation: $\log Bv = 1.588 - (0.578) (\log Kow)$

Bv = Soil-to-plant BCF (unitless; dry-weight basis)

Kow = Octanol-water partitioning coefficient (unitless)

Chemical	Log Kow	Log Kow Source	Soil-Plant BCF (Bv)(dry weight)
1,1-Dichloroethane	1.79	USEPA 1995	3.576
1,1-Dichloroethene	2.13	USEPA 1995	2.274
1,2-Dibromo-3-chloropropane	2.34	USEPA 1995	1.720
1,2-Dibromoethane	2	USEPA 1996	2.704
1,2-Dichlorobenzene	3.43	USEPA 1995	0.406
1,2-Dichloroethane	1.47	USEPA 1995	5.474
1,2-Dichloropropane	1.97	USEPA 1995	2.814
1,3-Dichloropropene (total)	2	USEPA 1995	2.704
2-Butanone	0.28	USEPA 1995	26.678
2-Hexanone	1.4	USEPA 1996	6.009
Acetone	-0.24	USEPA 1995	53.299
Benzene	2.13	USEPA 1995	2.274
Bromoform	2.35	USEPA 1995	1.697
Bromomethane	1.19	USEPA 1995	7.947
Carbon disulfide	2	USEPA 1995	2.704
Carbon tetrachloride	2.73	USEPA 1995	1.023
Chloroethane	1.43	SRC 2003	5.774
Chloroform	1.92	USEPA 1995	3.008
Chloromethane	0.91	USEPA 1995	11.535
cis-1,2-Dichloroethene	1.86	USEPA 1995	3.258
cis-1,3-Dichloropropene	2	USEPA 1995	2.704
Dibromochloromethane	2.2	USEPA 1996	2.157
Ethylbenzene	3.14	USEPA 1995	0.593
Tetrachloroethene	2.67	USEPA 1995	1.109
trans-1,2-Dichloroethene	2.07	USEPA 1995	2.463
trans-1,3-Dichloropropene	2	USEPA 1995	2.704
Trichloroethene	2.71	USEPA 1995	1.051
Vinyl chloride	1.5	USEPA 1995	5.260
Xylene, total	3.17	USEPA 1995	0.548

References

- Jones, D.S., G.W. Suter II, and R.N. Hull. *Toxicological benchmarks for screening contaminants of potential concern for effects on sediment-associated biota: 1997 revision*. Environmental Restoration Division, ORNL Environmental Restoration Program. ES/ER/TM-95/R4. 1997.
- Sample, B.E., D.M. Opresko, and G.W. Suter II. *Toxicological benchmarks for wildlife: 1996 revision*. Environmental Restoration Division, ORNL Environmental Restoration Program. ES/ER/TM-86/R3. 1996.
- Syracuse Research Corporation (SRC). Experimental octanol/water partition coefficient (Log P) database. <http://esc.syrres.com/~esc1/srckowdb.htm>. 2003.
- U.S. Environmental Protection Agency (USEPA). *Superfund chemical data matrix*. EPA/540/R-96/028. 1996.
- U.S. Environmental Protection Agency (USEPA). *Internal report on summary of measured, calculated and recommended log Kow values*. Environmental Research Laboratory, Athens, GA. 10 April. 1995.

Attachment D

Example Spreadsheets for Foodweb Model Calculations

D-1

Chemical Concentrations in Environmental Media

Chemical	Maximum Surface Soil Concentration (mg/kg, dry weight)
Aluminum	13300
Arsenic	766
Barium	37900
Cadmium	110
Chromium	1080
Cobalt	42
Copper	1400
Iron	103000
Lead	3310
Manganese	744
Mercury	3.1
Nickel	576
Selenium	4.3
Silver	45.7
Thallium	1.4
Vanadium	41.4
Zinc	6640
4,4'-DDE	15
4,4'-DDT	2.6
Aldrin	1.3
Aroclor-1016	0.81
Aroclor-1221	1.6
Aroclor-1232	0.81
Aroclor-1242	0.81
Aroclor-1248	0.84
Aroclor-1254	19
Aroclor-1260	7.2
Dieldrin	1.3
Endosulfan I	0.12
Endosulfan II	0.025
Endosulfan Sulfate	0.18
Endrin	0.19
Endrin Ketone	0.12
Gamma-Chlordane	8.9
Heptachlor	0.26
Methoxychlor	1.8
Toxaphene	4.2
1,2-Dichlorobenzene	5.5
1,3-Dichlorobenzene	14
2,4,5-Trichlorophenol	28
2,4,6-Trichlorophenol	11
2,4-Dichlorophenol	11
2,4-Dinitrophenol	28
2,4-Dinitrotoluene	11
2,6-Dinitrotoluene	11
2-Chloronaphthalene	11

D-1

Chemical Concentrations in Environmental Media

Chemical	Maximum Surface Soil Concentration (mg/kg, dry weight)
2-Chlorophenol	11
2-Methylnaphthalene	74
2-Nitroaniline	28
2-Nitrophenol	11
3,3'-Dichlorobenzidine	11
3-Nitroaniline	28
4-Bromophenyl-Phenylether	11
4-Chloroaniline	11
4-Chlorophenyl-Phenylether	11
4-Nitroaniline	28
4-Nitrophenol	28
Acenaphthylene	2.2
Anthracene	61
Benzo(a)anthracene	120
Benzo(a)pyrene	110
Benzo(b)fluoranthene	110
Benzo(g,h,i)perylene	58
Benzo(k)fluoranthene	71
Bis(2-Chloroethoxy)methane	11
Bis(2-Chloroethyl)ether	11
Bis(2-Ethylhexyl)phthalate	59
Butylbenzylphthalate	9.2
Carbazole	12
Chrysene	120
Dibenz(a,h)anthracene	19
Dibenzofuran	10
Di-n-octylphthalate	0.28
Fluoranthene	290
Fluorene	22
Hexachlorobenzene	11
Hexachlorocyclopentadiene	11
Hexachloroethane	11
Indeno(1,2,3-cd)pyrene	59
Isophorone	0.023
Naphthalene	34
Nitrobenzene	11
N-Nitroso-di-n-propylamine	11
Phenanthrene	220
Pyrene	230
Carbon Tetrachloride	14
Chloroform	1.4
Tetrachloroethene	60
Xylenes (total)	48

Table D-2**Bioaccumulation/Bioconcentration Factors**

Chemical	Maximum Soil-Plant BCF (dry weight)	Maximum Soil-Worm BAF (dry weight)
Antimony	0.2	1
Arsenic	1.103	0.523
Barium	0.15	0.36
Cadmium	3.25	40.69
Chromium	0.0075	3.162
Cobalt	0.02	1
Copper	0.625	1.531
Iron	0.004	0.1
Lead	0.468	1.522
Manganese	0.25	0.124
Mercury	5	20.63
Nickel	1.411	4.73
Selenium	3.012	1.34
Silver	0.4	1
Thallium	0.004	1
Vanadium	0.006	0.088
Zinc	1.82	12.89
4,4'-DDE	0.005	10.6
4,4'-DDT	0.007	0.7
Aldrin	0.007	1
alpha-Chlordane	0.009	3
Aroclor-1016	0.022	15.91
Aroclor-1221	0.074	15.91
Aroclor-1232	0.044	15.91
Aroclor-1242	0.022	15.91
Aroclor-1248	0.010	15.91
Aroclor-1254	0.007	15.91
Aroclor-1260	0.005	15.91
Dieldrin	0.031	8
Endosulfan I	0.237	1
Endosulfan II	0.095	1
Endosulfan Sulfate	0.281	1
Endrin	0.046	1
Endrin Ketone	0.189	1
Gamma-Chlordane	0.009	3
Heptachlor	0.009	10
Methoxychlor	0.045	1
Toxaphene	0.026	1
1,2-Dichlorobenzene	0.403	1
1,3-Dichlorobenzene	0.367	1
2,4,5-Trichlorophenol	0.216	8.4
2,4,6-Trichlorophenol	0.281	1
2,4-Dichlorophenol	0.642	1

Table D-2
Bioaccumulation/Bioconcentration Factors

Chemical	Maximum Soil-Plant BCF (dry weight)	Maximum Soil-Worm BAF (dry weight)
2,4-Dimethylphenol	1.675	1
2,4-Dinitrophenol	4.922	1
2,4-Dinitrotoluene	2.668	1
2,6-Dinitrotoluene	3.215	1
2-Chloronaphthalene	0.165	1
2-Chlorophenol	2.215	1
2-Methylnaphthalene	0.216	0.2
2-Nitroaniline	3.089	1
2-Nitrophenol	3.529	1
3,3'-Dichlorobenzidine	0.362	1
3-Nitroaniline	6.009	1
4-Bromophenyl-Phenylether	0.050	1
4-Chloroaniline	3.301	1
4-Chlorophenyl-Phenylether	0.053	1
4-Nitroaniline	6.009	1
4-Nitrophenol	3.089	1
Acenaphthene	0.210	0.3
Acenaphthylene	0.165	0.22
Anthracene	0.091	0.32
Benzo(a)anthracene	0.020	0.27
Benzo(a)pyrene	0.011	0.34
Benzo(b)fluoranthene	0.010	0.21
Benzo(g,h,i)perylene	0.005	0.15
Benzo(k)fluoranthene	0.010	0.21
Bis(2-Chloroethoxy)methane	14.273	1
Bis(2-Chloroethyl)ether	7.738	1
Bis(2-Ethylhexyl)phthalate	0.002	1
Butylbenzylphthalate	0.062	1
Carbazole	0.326	1
Chrysene	0.020	0.44
Dibenz(a,h)anthracene	0.005	0.49
Dibenzofuran	0.145	1
Dimethylphthalate	4.792	1
Di-n-octylphthalate	0.001	1
Fluoranthene	0.043	0.37
Fluorene	0.143	0.2
Hexachlorobutadiene	0.064	1
Hexachlorobenzene	0.015	1.69
Hexachlorocyclopentadiene	0.030	1
Hexachloroethane	0.189	1
Indeno(1,2,3-cd)pyrene	0.006	0.41
Isophorone	4.031	1
Naphthalene	0.443	0.21
Nitrobenzene	3.346	1
N-Nitroso-di-n-propylamine	6.009	1

Table D-2
Bioaccumulation/Bioconcentration Factors

Chemical	Maximum Soil-Plant BCF (dry weight)	Maximum Soil-Worm BAF (dry weight)
N-Nitrosodiphenylamine	0.578	1
Pentachlorophenol	0.044	8
Phenanthrene	0.091	0.28
Phenol	5.402	1
Pyrene	0.043	0.39
1,1,1-Trichloroethane	1.427	1
1,1,2,2-Tetrachloroethane	1.609	1
1,1,2-Trichloroethane	2.530	1
1,1-Dichloroethane	3.576	1
1,1-Dichloroethene	2.274	1
1,2-Dibromo-3-Chloropropane	1.720	1
1,2-Dibromoethane	2.704	1
1,2-Dichloroethane	5.474	1
1,2-Dichloropropane	2.814	1
2-Butanone	26.678	1
2-Hexanone	6.009	1
Acetone	53.299	1
Benzene	2.274	1
Bromoform	1.697	1
Bromomethane	7.947	1
Carbon Disulfide	2.704	1
Carbon Tetrachloride	1.023	1
Chloroethane	5.774	1
Chloroform	3.008	1
Chloromethane	11.535	1
Cis-1,2-Dichloroethene	3.258	1
Cis-1,3-Dichloropropene	2.704	1
Dibromochloromethane	2.157	1
Tetrachloroethene	1.109	1
Trans-1,2-Dichloroethene	2.463	1
Trans-1,3-Dichloropropene	2.704	1
Trichloroethene	1.051	1
Vinyl Chloride	5.260	1
Xylenes (total)	0.548	1

D-3

Food Concentrations

Chemical	Maximum Terrestrial Plant Concentration (mg/kg, dry weight)	Maximum Terrestrial Invertebrate Concentration (mg/kg, dry weight)
Aluminum	53.2	2660.0
Arsenic	844.9	400.6
Barium	5685.0	13644.0
Cadmium	357.5	4475.9
Chromium	8.1	3415.0
Cobalt	0.840	42.0
Copper	875.0	2143.4
Iron	412.0	10300.0
Lead	1549.1	5037.8
Manganese	186.0	92.3
Mercury	15.5	64.0
Nickel	812.7	2724.5
Selenium	13.0	5.8
Silver	18.3	45.7
Thallium	0.006	1.4
Vanadium	0.228	3.6
Zinc	12084.8	85589.6
4,4'-DDE	0.072	159.0
4,4'-DDT	0.017	1.8
Aldrin	0.009	1.3
Aroclor-1016	0.018	12.9
Aroclor-1221	0.119	25.5
Aroclor-1232	0.035	12.9
Aroclor-1242	0.018	12.9
Aroclor-1248	0.008	13.4
Aroclor-1254	0.129	302.3
Aroclor-1260	0.032	114.6
Dieldrin	0.040	10.4
Endosulfan I	0.028	0.120
Endosulfan II	0.002	0.025
Endosulfan Sulfate	0.051	0.180
Endrin	0.009	0.190
Endrin Ketone	0.023	0.120
Gamma-Chlordane	0.077	26.7
Heptachlor	0.002	2.6
Methoxychlor	0.081	1.8
Toxaphene	0.108	4.2
1,2-Dichlorobenzene	2.2	5.5
1,3-Dichlorobenzene	5.1	14.0
2,4,5-Trichlorophenol	6.0	235.2
2,4,6-Trichlorophenol	3.1	11.0
2,4-Dichlorophenol	7.1	11.0
2,4-Dinitrophenol	137.8	28.0
2,4-Dinitrotoluene	29.4	11.0
2,6-Dinitrotoluene	35.4	11.0

D-3

Food Concentrations

Chemical	Maximum Terrestrial Plant Concentration (mg/kg, dry weight)	Maximum Terrestrial Invertebrate Concentration (mg/kg, dry weight)
2-Chloronaphthalene	1.8	11.0
2-Chlorophenol	24.4	11.0
2-Methylnaphthalene	16.0	14.8
2-Nitroaniline	86.5	28.0
2-Nitrophenol	38.8	11.0
3,3'-Dichlorobenzidine	4.0	11.0
3-Nitroaniline	168.3	28.0
4-Bromophenyl-Phenylethe	0.549	11.0
4-Chloroaniline	36.3	11.0
4-Chlorophenyl-Phenylethe	0.586	11.0
4-Nitroaniline	168.3	28.0
4-Nitrophenol	86.5	28.0
Acenaphthylene	0.364	0.484
Anthracene	5.5	19.5
Benzo(a)anthracene	2.4	32.4
Benzo(a)pyrene	1.3	37.4
Benzo(b)fluoranthene	1.1	23.1
Benzo(g,h,i)perylene	0.302	8.7
Benzo(k)fluoranthene	0.717	14.9
Bis(2-Chloroethoxy)methan	157.0	11.0
Bis(2-Chloroethyl)ether	85.1	11.0
Bis(2-Ethylhexyl)phthalate	0.136	59.0
Butylbenzylphthalate	0.568	9.2
Carbazole	3.9	12.0
Chrysene	2.4	52.8
Dibenz(a,h)anthracene	0.101	9.3
Dibenzofuran	1.4	10.0
Di-n-octylphthalate	0.000	0.280
Fluoranthene	12.3	107.3
Fluorene	3.1	4.4
Hexachlorobenzene	0.168	18.6
Hexachlorocyclopentadiene	0.327	11.0
Hexachloroethane	2.1	11.0
Indeno(1,2,3-cd)pyrene	0.330	24.2
Isophorone	0.093	0.023
Naphthalene	15.0	7.1
Nitrobenzene	36.8	11.0
N-Nitroso-di-n-propylamine	66.1	11.0
Phenanthrene	20.0	61.6
Pyrene	9.9	89.7
Carbon Tetrachloride	14.3	14.0
Chloroform	4.2	1.4
Tetrachloroethene	66.5	60.0
Xylenes (total)	26.3	48.0

Table D-4
Receptor Exposure Factors

Parameter	Receptor	
	White-footed mouse	American robin
Maximum Water Ingestion Rate (L/d)	0.009	0.013
Maximum Food Ingestion Rate kg/d (wet weight)	0.005	0.048
% Solids	0.15	0.15
Maximum Food Ingestion Rate (kg/d, dry weight)	0.001	0.007
Minimum Body weight (kg, wet weight)	0.014	0.064
Max - Diet Terr Plants %	0.510	0.516
Max - Diet Terr Inv %	0.470	0.436
Max - Diet Soil %	0.020	0.048
Max - Diet Check Sum %	1.000	1.000

Table D-5
Receptor Exposure Factor Sources

Parameter	Receptor		Source
	White-footed mouse	American robin	
Body Weight (Minimum) (kg, wet weight)	0.014 min for M/F - MD	0.064 min for M/F - PA	Silva and Downing 1995, USEPA 1993
Body Weight (Minimum) (kg, wet weight)	0.031 max for M/F - MD	0.103 max for M/F - PA	Silva and Downing 1995, USEPA 1993
Food Ingestion Rate (Maximum) (kg/d, wet weight)	0.005 15.5% of max BW	0.048 weighted by diet; max BW	Sample and Suter 1994, Levey and Karasov 1989
Food Ingestion Rate (Maximum, Allometric) (kg/day, dry weight)	0.004	0.013	Martin et al. 1951, Sample and Suter 1994
Diet Terr Plants % (Maximum)	0.51	0.516	
Diet Terr Inv % (Maximum)	0.47	0.436	
Diet Soil Ingestion % (Maximum)	0.02	0.048	Beyer et al. 1994, Sample and Suter 1994

Table D-6

Risk Comparison - White-Footed Mouse

Chemical	Maximum Soil Concentration (mg/kg, dry weight)	Maximum Plant Concentration (mg/kg dry weight)	Maximum Terrestrial Invertebrate Concentration (mg/kg dw)	Maximum Dose (mg/kg dry weight)	Maximum HQ (unitless)
Aluminum	13300	53.2	2660	80.1	4.2
Arsenic	766	844.9	400.6	32.9	261.4
Barium	37900	5685	13644	522.6	102.5
Cadmium	110	357.5	4475.9	118.8	118.8
Chromium	1080	8.1	3415.0	84.6	6.4
Cobalt	42	0.840	42	1.1	0.220
Copper	1400	875	2143.4	76.9	6.6
Iron	103000	412	10300	369.1	7.4
Lead	3310	1549.08	5037.8	167.3	20.9
Manganese	744	186	92.3	7.9	0.090
Mercury	3.1	15.5	64.0	2.0	61.7
Nickel	576	812.7	2724.5	88.6	2.2
Selenium	4.3	13.0	5.8	0.500	2.4
Silver	45.7	18.3	45.7	1.6	0.090
Thallium	1.4	0.006	1.4	<0.01	0.480
Vanadium	41.4	0.228	3.6	0.100	0.660
Zinc	6640	12084.8	85589.6	2414.6	15.1
4,4'-DDE	15	0.072	159	3.9	4.9
4,4'-DDT	2.6	0.017	1.8	<0.01	0.060
Aldrin	1.3	0.009	1.3	<0.01	0.170
Aroclor-1016	0.810	0.018	12.9	0.300	0.230
Aroclor-1221	1.6	0.119	25.5	0.600	9.1
Aroclor-1232	0.810	0.035	12.9	0.300	4.6
Aroclor-1242	0.810	0.018	12.9	0.300	4.6
Aroclor-1248	0.840	0.008	13.4	0.300	0.250
Aroclor-1254	19	0.129	302.3	7.4	108.8
Aroclor-1260	7.2	0.032	114.6	2.8	41.2
Dieldrin	1.3	0.040	10.4	0.300	12.8
Endosulfan I	0.120	0.028	0.120	<0.01	<0.01
Endosulfan II	0.025	0.002	0.025	<0.01	<0.01
Endosulfan Sulfate	0.180	0.051	0.180	<0.01	<0.01
Endrin	0.190	0.009	0.190	<0.01	0.060
Endrin Ketone	0.120	0.023	0.120	<0.01	0.040
Gamma-Chlordane	8.9	0.077	26.7	0.700	0.140
Heptachlor	0.260	0.002	2.6	0.100	0.640
Methoxychlor	1.8	0.081	1.8	<0.01	0.010
Toxaphene	4.2	0.108	4.2	0.100	0.010
1,2-Dichlorobenzene	5.5	2.2	5.5	0.200	<0.01
1,3-Dichlorobenzene	14	5.1	14.0	0.500	0.010
2,4,5-Trichlorophenol	28	6.0	235.2	5.9	0.070
2,4,6-Trichlorophenol	11	3.1	11.0	0.400	<0.01
2,4-Dichlorophenol	11	7.1	11.0	0.500	<0.01
2,4-Dinitrophenol	28	137.8	28.0	4.4	NA
2,4-Dinitrotoluene	11	29.4	11.0	1.1	NA

Table D-6

Risk Comparison - White-Footed Mouse

Chemical	Maximum Soil Concentration (mg/kg, dry weight)	Maximum Plant Concentration (mg/kg dry weight)	Maximum Terrestrial Invertebrate Concentration (mg/kg dw)	Maximum Dose (mg/kg dry weight)	Maximum HQ (unitless)
2,6-Dinitrotoluene	11	35.4	11.0	1.2	NA
2-Chloronaphthalene	11	1.8	11.0	0.300	NA
2-Chlorophenol	11	24.4	11.0	0.900	NA
2-Methylnaphthalene	74	16.0	14.8	0.900	0.01
2-Nitroaniline	28	86.5	28.0	3	NA
2-Nitrophenol	11	38.8	11.0	1.3	NA
3,3'-Dichlorobenzidine	11	4.0	11.0	0.400	NA
3-Nitroaniline	28	168.3	28.0	5.2	NA
4-Bromophenyl-Phenylether	11	0.549	11.0	0.300	NA
4-Chloroaniline	11	36.3	11.0	1.2	NA
4-Chlorophenyl-Phenylether	11	0.586	11.0	0.300	NA
4-Nitroaniline	28	168.3	28.0	5.2	NA
4-Nitrophenol	28	86.5	28.0	3.0	NA
Acenaphthylene	2.2	0.364	0.484	<0.01	<0.01
Anthracene	61	5.5	19.5	0.700	<0.01
Benzo(a)anthracene	120	2.4	32.4	1.0	0.980
Benzo(a)pyrene	110	1.3	37.4	1.1	1.06
Benzo(b)fluoranthene	110	1.1	23.1	0.700	0.710
Benzo(g,h,i)perylene	58	0.302	8.7	0.300	0.000
Benzo(k)fluoranthene	71	0.717	14.9	0.500	0.460
Bis(2-Chloroethoxy)methane	11	157.0	11.0	4.4	NA
Bis(2-Chloroethyl)ether	11	85.1	11.0	2.5	NA
Bis(2-Ethylhexyl)phthalate	59	0.136	59.0	1.5	0.080
Butylbenzylphthalate	9.2	0.568	9.2	0.200	<0.01
Carbazole	12	3.9	12.0	0.400	<0.01
Chrysene	120	2.4	52.8	1.5	1.48
Dibenz(a,h)anthracene	19	0.101	9.3	0.200	0.250
Dibenzofuran	10	1.4	10.0	0.300	<0.01
Di-n-octylphthalate	0.280	0.0002	0.280	<0.01	<0.01
Fluoranthene	290	12.3	107.3	3.2	0.030
Fluorene	22	3.1	4.4	0.200	<0.01
Hexachlorobenzene	11	0.168	18.6	0.500	0.290
Hexachlorocyclopentadiene	11	0.327	11.0	0.300	0.030
Hexachloroethane	11	2.1	11.0	0.300	NA
Indeno(1,2,3-cd)pyrene	59	0.330	24.2	0.700	0.660
Isophorone	0.023	0.093	0.023	0.000	NA
Naphthalene	34	15.0	7.1	0.600	<0.01
Nitrobenzene	11	36.8	11.0	1.3	NA
N-Nitroso-di-n-propylamine	11	66.1	11.0	2.0	NA
Phenanthrene	220	20.0	61.6	2.3	0.020
Pyrene	230	9.9	89.7	2.7	0.020
Carbon Tetrachloride	14	14.3	14.0	0.700	0.050
Chloroform	1.4	4.2	1.4	0.100	0.000
Tetrachloroethylene	60	66.5	60.0	3.3	0.100
Xylenes (total)	48	26.3	48.0	1.9	0.910

Table D-7
Risk Comparison - American Robin

Chemical	Maximum Soil Concentration (mg/kg, dry weight)	Maximum Plant Concentration (mg/kg, dry)	Maximum Terrestrial Invertebrate Concentration	Maximum Dose (mg/kg/d)	Maximum HQ (unitless)
Aluminum	13300.0	53.2	2660.0	211.4	1.9
Arsenic	766.0	844.9	400.6	75.0	30.5
Barium	37900.0	5685.0	13644.0	1239.0	6.0
Cadmium	110.0	357.5	4475.9	247.9	171.0
Chromium	1080.0	8.1	3415.0	178.9	178.9
Cobalt	42.0	0.840	42.0	2.4	1.6
Copper	1400.0	875.0	2143.4	168.3	3.6
Iron	103000.0	412.0	10300.0	1117.0	11.2
Lead	3310.0	1549.1	5037.8	365.3	323.2
Manganese	744.0	186.0	92.3	19.9	0.020
Mercury	3.1	15.5	64.0	4.2	9.3
Nickel	576.0	812.7	2724.5	189.3	2.5
Selenium	4.3	13.0	5.8	1.1	2.5
Silver	45.7	18.3	45.7	3.7	0.020
Thallium	1.4	0.006	1.4	0.100	0.230
Vanadium	41.4	0.228	3.6	0.400	0.040
Zinc	6640.0	12084.8	85589.6	5079.5	350.3
4,4'-DDE	15.0	0.072	159.0	8.1	162.3
4,4'-DDT	2.6	0.017	1.8	0.100	2.2
Aldrin	1.3	0.009	1.3	0.100	0.150
Aroclor-1016	0.810	0.018	12.9	0.700	1.6
Aroclor-1221	1.6	0.119	25.5	1.3	3.2
Aroclor-1232	0.810	0.035	12.9	0.700	1.6
Aroclor-1242	0.810	0.018	12.9	0.700	1.6
Aroclor-1248	0.840	0.008	13.4	0.700	3.8
Aroclor-1254	19.0	0.129	302.3	15.4	85.4
Aroclor-1260	7.2	0.032	114.6	5.8	32.4
Dieldrin	1.3	0.040	10.4	0.500	6.9
Endosulfan I	0.120	0.028	0.1	<0.01	<0.01
Endosulfan II	0.025	0.002	0.0	<0.01	<0.01
Endosulfan Sulfate	0.180	0.051	0.2	<0.01	<0.01
Endrin	0.190	0.009	0.2	<0.01	1.1
Endrin Ketone	0.120	0.023	0.1	<0.01	0.810
Gamma-Chlordane	8.9	0.077	26.7	1.4	0.660
Heptachlor	0.3	0.002	2.6	0.100	0.330
Methoxychlor	1.8	0.081	1.8	0.100	0.000
Toxaphene	4.2	0.108	4.2	0.200	0.790
1,2-Dichlorobenzene	5.5	2.2	5.5	0.400	<0.01
1,3-Dichlorobenzene	14.0	5.1	14.0	1.1	<0.01
2,4,5-Trichlorophenol	28.0	6.0	235.2	12.4	NA
2,4,6-Trichlorophenol	11.0	3.1	11.0	0.800	NA
2,4-Dichlorophenol	11.0	7.1	11.0	1.0	NA
2,4-Dinitrophenol	28.0	137.8	28.0	9.8	NA
2,4-Dinitrotoluene	11.0	29.4	11.0	2.4	NA

Table D-7
Risk Comparison - American Robin

Chemical	Maximum Soil Concentration (mg/kg, dry weight)	Maximum Plant Concentration (mg/kg, dry)	Maximum Terrestrial Invertebrate Concentration	Maximum Dose (mg/kg/d)	Maximum HQ (unitless)
2,6-Dinitrotoluene	11.0	35.4	11.0	2.7	NA
2-Chloronaphthalene	11.0	1.8	11.0	0.700	NA
2-Chlorophenol	11.0	24.4	11.0	2.1	NA
2-Methylnaphthalene	74.0	16.0	14.8	2.1	NA
2-Nitroaniline	28.0	86.5	28.0	6.7	NA
2-Nitrophenol	11.0	38.8	11.0	2.9	NA
3,3'-Dichlorobenzidine	11.0	4.0	11.0	0.900	NA
3-Nitroaniline	28.0	168.3	28.0	11.6	NA
4-Bromophenyl-Phenylether	11.0	0.549	11.0	0.600	NA
4-Chloroaniline	11.0	36.3	11.0	2.8	NA
4-Chlorophenyl-Phenylether	11.0	0.586	11.0	0.700	NA
4-Nitroaniline	28.0	168.3	28.0	11.6	NA
4-Nitrophenol	28.0	86.5	28.0	6.7	NA
Acenaphthylene	2.2	0.364	0.484	0.100	<0.01
Anthracene	61.0	5.5	19.5	1.7	0.070
Benzo(a)anthracene	120.0	2.4	32.4	2.4	0.060
Benzo(a)pyrene	110.0	1.3	37.4	2.6	0.070
Benzo(b)fluoranthene	110.0	1.1	23.1	1.8	0.050
Benzo(g,h,i)perylene	58.0	0.302	8.7	0.800	0.020
Benzo(k)fluoranthene	71.0	0.717	14.9	1.2	0.030
Bis(2-Chloroethoxy)methane	11.0	157.0	11.0	10.0	NA
Bis(2-Chloroethyl)ether	11.0	85.1	11.0	5.7	NA
Bis(2-Ethylhexyl)phthalate	59.0	0.136	59.0	3.3	3.0
Butylbenzylphthalate	9.2	0.568	9.2	0.500	NA
Carbazole	12.0	3.9	12.0	0.900	NA
Chrysene	120.0	2.4	52.8	3.5	0.090
Dibenz(a,h)anthracene	19.0	0.101	9.3	0.600	0.010
Dibenzofuran	10.0	1.4	10.0	0.600	NA
Di-n-octylphthalate	0.280	0.000	0.3	<0.01	<0.01
Fluoranthene	290.0	12.3	107.3	7.8	0.200
Fluorene	22.0	3.1	4.4	0.500	0.010
Hexachlorobenzene	11.0	0.168	18.6	1.0	12.6
Hexachlorocyclopentadiene	11.0	0.327	11.0	0.600	NA
Hexachloroethane	11.0	2.1	11.0	0.700	NA
Indeno(1,2,3-cd)pyrene	59.0	0.330	24.2	1.6	0.040
Isophorone	0.0	0.093	0.023	<0.01	NA
Naphthalene	34.0	15.0	7.1	1.4	0.060
Nitrobenzene	11.0	36.8	11.0	2.8	NA
N-Nitroso-di-n-propylamine	11.0	66.1	11.0	4.6	NA
Phenanthrene	220.0	20.0	61.6	5.5	0.140
Pyrene	230.0	9.9	89.7	6.4	0.160
Carbon Tetrachloride	14.0	14.3	14.0	1.6	NA
Chloroform	1.4	4.2	1.4	0.3	NA
Tetrachloroethene	60.0	66.5	60.0	7.3	NA
Xylenes (total)	48.0	26.3	48.0	4.3	0.110

References

- Beyer, W.N., E.E. Connor, and S. Gerould. Estimates of soil ingestion by wildlife. *Journal of Wildlife Management.* 58:375-382. 1994.
- Levey, D.J. and W.H. Karasov. Digestive responses of temperate birds switched to fruit or insect diets. *Auk.* 106:675-686. 1989.
- Martin, A.C., H.S. Zim, and A.L. Nelson. *American wildlife and plants: a guide to wildlife food habits.* Dover Publications, Inc. New York, NY. 500 pp. 1951.
- Sample, B.E. and G.W. Suter II. *Estimating exposure of terrestrial wildlife to contaminants.* Environmental Restoration Division, ORNL Environmental Restoration Program. ES/ER/TM-125. 1994.
- Silva, M. and J.A. Downing. *CRC handbook of mammalian body masses.* CRC Press, Boca Raton, FL. 359 pp. 1995.
- U.S. Environmental Protection Agency (USEPA). *Wildlife exposure factors handbook. Volume I of II.* EPA/600/R-93/187a. 1993.